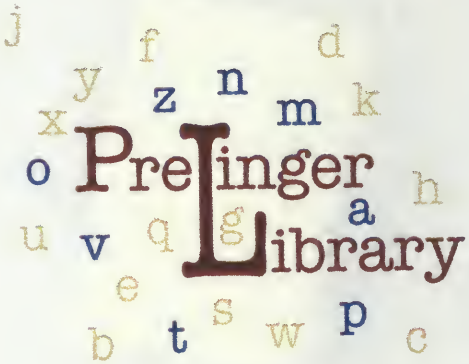
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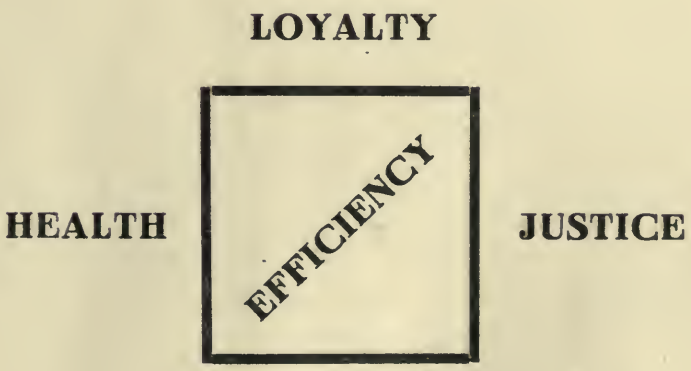
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Human Engineering

EDITED BY

WINTHROP TALBOT, M.D.

Index to Contents of Volume I



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Human Engineering

WINTHROP TALBOT, M.D., Editor

A Magazine for Employers and Employees published to provide a means of exchanging Experiences on the Human side of Industry and a Forum for the discussion of the Conservation of Human Energy.

PUBLISHED MONTHLY

Subscriptions Should Be Sent to Human Engineering, Station B, Cleveland

RATES

One Dollar A Year Fifteen Cents A Copy

Volume I. JANUARY, 1911 Number 1

CONTENTS

EDITORIAL

A STUDY IN HUMAN ENGINEERING WINTHROP TALBOT, M. D.

THE SCOPE OF A SERVICE DEPARTMENT D. C. LOWLES

CO-OPERATION HARRY D. THOMAS

BAD AIR PROBLEMS RUSSELL SPAULDING

THE SUGGESTION SYSTEM MIRIAM BIRDSEYE

THE BONUS SYSTEM WARREN S. STONE

THE HYGIENIC WINDOW WINTHROP TALBOT, M. D.

PROFIT-SHARING IN DETROIT A. A. BOUTELL

A PRACTICAL EXPERIENCE WITH THE FORTY-EIGHT-HOUR WEEK WYLIE M. CARHARTT

LEARNING A NEW PROCESS FLORENCE H. TRESILIAN, M. D.

POINTS AND HINTS FROM WEYL'S HYGIENE . . CEPHAS GUILLET, PH. D.

A SIGN OF THE TIMES: OCCUPATIONAL DISEASES

CURRENT REVIEW

CONSULAR REPORTS: Legal Status of Trusts in Germany
Cost of Living
Juvenile Employment in Birmingham
Wages in Germany

SYSTEM: Because He Could Handle Men
Psychology of Business

SURVEY: January 7—Fires, Factories, and Prevention
Industrial Communities
Conservation of Eyesight
Editorial: Chicago Strike Ending; How the Engineers' Strike Was Averted
January 21—Limitation of Women's Working Hours

SCRIBNERS: German Experiments with Unemployment Insurance

ENGINEERING MAGAZINE: Efficiency
Ventilation

POPULAR SCIENCE: Smoke Prevention

HARVESTER WORLD: A Significant Gathering

Editorial

"Human Engineering" is published to provide a means of exchanging experiences on the human side of industry and to open a forum for discussion of the conservation of human energy. It is a magazine, NOT OF PHILANTHROPY, but of INDUSTRIAL MANAGEMENT AND INTELLIGENT BUSINESS THRIFT IN ITS MODERN AND BROADEST SENSE. On the mechanical side of engineering we have the information needed to keep our mechanical work up-to-date, presented in a readable and concise form by scores of ably edited journals. On the human side there are none.

"Human Engineering" will try to present each month:

1. Original articles contributed by employers and employed, whose experience will be worth heeding.

2. A digest of articles of note taken from journals published along other lines.

3. A bibliography of current literature and notes of interest, dealing with the mechanics of human effort.

4. A public forum or moot court for the open discussion of points which permit of honest difference of opinion.

It is hoped that employers and employed will contribute to its columns freely.

Direct, 1.50

The human element in industry is ninety-five per cent of the industrial problem, whether it be the running of an engine, the construction of a bridge, the mining of ore, the stitching of a shirt, or, more complex than all, the making of a home.

There are employers all over this land who would make conditions better if they knew how. Most workers would be glad to do better if conditions permitted. The light which we all are seeking can only come by each contributing his own experience to the common store of knowledge. These rivulets of human thought and work commingling would make a mighty Niagara to furnish mental power to turn the wheels of trade. The psychology of industry today is relatively in the age of handlooms and tallow candles.

Charity and hate, generosity and greed, truth and deceit, courage and cowardice, industry and sloth, kindliness and a bitter tongue, all have physical conditions as a basis, for they are the expression of human thought or brain processes and all brain processes are affected, in large measure, by air and food, by heat and moisture as well as by human relations. These are the notes of human interest which determine the harmony or discord of human action. It is worth while, then, to seek the sources and motives of human energy, to study conditions of employment and human living with an eye to the making profitable music out of the present costly jangle of discord.

A Study in Human Engineering

"Human Engineering" is a phrase devised by the writer to describe a new profession called into being by new conditions in the industrial world. There is an old saying that "evil communications corrupt good manners." An up-to-date rendering would be "quick communication compels good manners." The typewriter, the telephone and the telegraph, and easy transportation make competition and industrial strife expensive and so destructive that wise co-operation and kindly consideration must need be watchwords of modern industry. Capital is the tool of labor and must be used by the individual and the community for the benefit of all.

A great manufacturer said the other day, "If my business meant simply the making of money, I should make my little pile and get out as soon as possible, and devote myself to study, travel, and the fun of doing things that are worth while. But the business of our company consists in not only making useful things, but in making them in such a way that everybody concerned in the industry shall be the better for association with it. Our motto is "I would rather make men than money."

The conducting of business with ideals of this type demands the highest and best faculties of any man, however gifted. The ability to conceive ideals and the poise and pertinacity to obtain their practical realization is genius, and genius devoted to community service and the common weal, spells happiness and progress for us all. Unreasoning and self-centered greed, the foul dragon of the industrial world, can be overcome only by the knightly prowess of the St. George of modernism—co-operation. The rivalry of friendly emulation is sane and wholesome, the miasma of unrelenting competition is deadly.

* * *

Co-operation is the spirit of modern industry and the man who cannot see that the development of combination in industry is economic and inevitable, is a Mrs. Partington in trousers, endeavoring to sweep back the flood tide of mutual service. We cannot revert to the competition of a quarter of a century, or even ten years, ago without reviving the cut-throat conditions that then existed.

A casual investigation, even, of the organization of a business corporation of the successful type shows keen appreciation of system in executive organization. In such an industry there are departments of manufacturing, sales, purchasing, accounting and auditing, transportation, engineering, development and research. The executive force may be loyal, intelligent and interested. Everything has been organized by the management except what is most important and vital, viz.: the human element among the body of employees. The organization of this element is left to outsiders and is accomplished at times by humane men of broad and high ideals, but often, too, by selfish and designing men with self-interest alone at heart. Labor dulls its sharpest instrument when it alienates capital, and capital in recent days finds its only safeguard through a broader scheme of intelligent organization of the users of the tool.

In examining work-shops of the modern type one is struck with the keen appreciation by superintendents and foremen of accurate and scientific information of mechanical methods. Machines are placed with care, kept clean

and supplied with oil, bolts and pulleys are inspected, worn parts replaced, speed regulated and action studied with painstaking care. The mechanics of production in a well organized shop is a marvel of human ingenuity. There is a force of executives—a superintendent, a foreman, the master mechanics, the inspectors—employed at large expense to conduct the mechanical side. But where is the department to look after the men who run the machines? What method of organization has been adopted on the human side? Who is making a study of health? What specialists are employed to regulate hourly the humidity and temperature of the work room, to see that air is not stagnant, but that a steady flow renders possible comfort for the worker. Who is designated to prevent overspeeding of the operative, entailing a breakdown and the employment of new and untrained men and women at large expense with breakage and loss of time as a necessary sequence? Who is appointed to study the fitness of the operative for his special task, to see that a near-sighted person is not put on work requiring acute vision, that a left-handed man is not running a right-handed machine, that a slow mentality is not expected to do a quick job, that the muscularly weak are not put at laborious tasks, and the irresponsible youngster in charge of dangerous machinery, or processes involving risk to health and happiness, such as stupid sweeping and cleaning while people are at work. The dust raised by one careless boy sweeping in a crowded room may incapacitate by sore throat and catarrhal conditions the most valuable workers in the shop. Would a mechanic be permitted to sweep dust over a printing-press at work or any other machine in costly operation? One of the most ignorant sayings that could possibly be devised is that human life is cheap. Everyone pays for the inefficiency of others, just as the whole body suffers if the little cells in one single organ are irritated or diseased.

The very intensity and closeness of human relationship brings about the appreciation of the basic fact of civilization that each is his brother's keeper, and if in industry the A, B, C, of applied medicine and psychology is unknown, then it is high time we went to school. Our first discovery is plainly the lack of teachers and sources of information and instruction. A new science is the inevitable outgrowth of these conditions—the science of Human Engineering.

In an organization there should be a Department of Human Engineering as contrasted with Mechanical Engineering. It may be called a Department of Health and Economics, a Service Department, a Welfare Department. *Its work is the study of the physical and mental basis of efficiency in industry. Its purpose is to promote efficiency, not of machines but of men and women, to decrease waste—especially of human energy—and to discover and remove causes of avoidable and preventable friction, irritation, or injury.* By waste of human energy is meant the loss due to such causes as follows: effects of bad ventilation, unfitness through poor eye-sight or other causes for the work assigned, discouragement of effort by lack of proper special rewards, lack of considerate and scientific methods in the re-adjustment of rates, lack of medical care, general neglect of human needs of the wage-earner, and disregard of the value of individual interest and co-operation in labor. This implies the application to industry of the cardinal principles of medicine, psychology, and economics, and withal to invent ways of so doing without arousing suspicion and distrust.

Under this Department should come hygiene and sanitation; control of plans for new construction as relating to ventilation, plumbing, heating, lighting, lavatories and dressing rooms, lunch rooms, rest and recreation rooms, and hospital facilities, medical care of employees during working hours; and especially provision of women counselors whose duty it should be to aid the

girls, assist the superintendents from the woman's point of view, and help in establishing harmonious relations between the industry and the general community. These comprise the function which may be termed "Conditions of Labor."

The second function is to make investigations as to the effect of the job upon the employee, to learn sympathetically his attitude toward his work, and to study the process that the work may be made truly effective by being done under conditions which shall be as devoid of discomfort to the employee as possible. The second function, then, is of Research, Experiment and Investigation.

There are, however, larger questions and more fundamental which fall within the range of such a Department, viz.: the study of Economics and Modern Methods of Co-operation. Under this heading may be classed the matter of compensation for injuries, mutual benefit associations, pensions, savings and loan funds, sick relief and industrial education, together with encouragement of such recreation as will be of benefit to employees as far as concerns their health and working capacity.

To recapitulate: the work of the Department is

1. Conditions of Labor.
2. Research, Experiment, and Investigation.
3. Modern Methods of Co-operation.

It is the facing of a practical problem of the organization and direction of such a Department that has led the writer to take active measures to get instruction and light from the experience of others. All over the country the economic need for such organization is becoming clear, through the fact that everywhere attempts are being made—in some cases with large success—to establish just such Departments, but most are working independently, making costly experiments on lines that already have been thought out by others. If we could each profit by the experience of all, much useless labor could be saved, but it is difficult to find where to turn for information. It is for this reason that our magazine, "Human Engineering," has been established.

If, then, in addition to the opportunities offered by civic Associations, we can have a record of accomplishment and a forum for discussion, published at fairly frequent intervals, it is hoped that everyone will profit thereby. The magazine has been thought out and instituted, and will be conducted, as far as possible for the general good and along broad lines for the betterment of human achievement. We trust that its influence may make for harmony and co-operation between those who are inevitably and mutually dependent—employer and employed, making for the ultimate establishment of civic stability and just conditions of life. WINTHROP TALBOT.

"It is a wasteful thing to have a workman killed or maimed. You can get along, perhaps, but it is a wasteful thing in society and a wasteful thing to that plant. It costs what he receives for his injury from the company, as through our scheme every man does; but there is a loss in the operation, there is a loss in the skill of that man. You have to train another. As a mere matter of business it is wise to have the machinery protected and everything done to make the work in the factories safe. The plans for bettering sanitary conditions and providing means of ventilation all have a direct reference to the conservation of natural resources of the highest order and character—the resources of men and women and children. If a company can be prompted and sustained by a spirit that industry can do something more than produce products and profits, then if a man falls in the ranks, whether he's a private or a general, he has fallen in a cause that is worth while."

EDGAR A. BANCROFT,
General Counsel to International Harvester Co.

The Scope of A Service Department

D. C. Lowles, Sherwin-Williams Company.

In the progress of every expanding industrial enterprise, there comes a time sooner or later when its officers realize that they have become detached as it were from the great majority of the workers. Increasing duties and expanding business have separated them from those in the organization with whom they were at one time or another intimately connected; that personal touch, so necessary to hearty co-operation, is gone. Conditions too have changed—now a dozen scattered factories, where before there was but one—a thousand workers have replaced the hundred, and not only that, but replacing the former native workmen have come in Italians, Greeks, Bohemians and the like. And with this influx of foreign labor and wonderful expansion has come decreased efficiency, lack of co-operation, and loss of personal loyalty.

What then is to be done; and how can loyalty, co-operation and human efficiency again become an integral part of the organization, so that every worker, high or low, may feel that he or she is truly a member of the Company, and that his or her work is a necessary part of the complete whole?

The answer can only be found in the recognition of responsibility to the employees and to the community of which they form a part.

We have been so busy, have we not, organizing our departments on Finance, Manufacturing, Sales, Chemistry, and Mechanical Engineering that we have forgotten the Humanity or Service end of the business. Of what use are Buildings, Machinery, Offices and Systems without the workers to operate them, and if the workers are inefficient the whole structure falls to the ground.

Here then comes in our "Human Engineering" or "Service" department to work out these problems on a satisfactory basis, to have charge of not only all the so-called Welfare features, but to increase the ability, knowledge, comfort and happiness of every individual connected with the organization, binding them all together into one compelling unit for the true advancement of themselves and the industry they represent.

The Service Department should include in its program the following:

a—Just and reasonable wages and hours of labor.

b—The Health and Safety of employees.

c—The operation of Sick Relief and Accident Compensation funds.

d—Pensions.

e—The operation of Savings and Loan funds.

f—The Education of employees.

g—The fostering of such Recreative features as will improve the well-being of the employees.

My purpose in this article will be to enlarge briefly on the various features of such a program, and then to invite your discussion on how best the program, in whole or in part, can be carried out.

We are all agreed, I think, that nothing can take the place of fair wages as a return to labor for service performed. It is indeed the prime factor upon which a right understanding between employer and employee should be built. Every worker is entitled to and should receive a wage according to the labor performed and commensurate with the cost of living—enough for food, clothing, lodging and education, and a little for a rainy day. A well-paid worker is more satisfied, stable and efficient than a poorly paid one.

Reasonable hours too are a necessity if good health and a maximum output are to be maintained. A comparison of overtime with regular time production would show in almost every case a heavy decrease in the production after hours.

Protection of the Health and Safety of employees is a duty incumbent upon every employer. It means that there must be good air free from dust, smelliness and gases, good light, proper ventilation, pure drinking water, and ample wash room and toilet facilities.

It means that all dangerous machinery shall be protected, all fire apparatus kept in working order and easy of access, that fire escapes and exits be sufficiently numerous and kept unobstructed, and that foremen in charge be efficient and reliable men. It covers Rest Rooms, Emergency Hospitals, Shower Baths, and Lunch Rooms and the organization of relief corps for "First aid" to the injured.

Prevention is better than cure, but it is, humanly speaking, impossible to entirely prevent sickness and accident. Therefore it is essential that the Servce Department embrace in its operations a well organized plan for relief. A doctor or a nurse should be within call, where there are many employees, maintained on the staff, with a well equipped dispensary at their disposal. Those who are absent through sickness should be visited and assisted where necessary. All employees should be encouraged to join a sick benefit association in order that the loss of wages in sickness will not be so severely felt, and also in order that those who are suffering from tuberculosis or other infectious diseases or are in any way physically unfitted for the work may be eliminated by the medical examination prescribed. A benefit association should include in its scope office employees and traveling representatives as well as factory workers, and care must be exercised that the dues required do not become a burden on any one class. It is better to eliminate the death benefit than to make it so large the dues become prohibitive.

Compensation for industrial accidents as opposed to "liability" is now an accepted principle, and some plan or scheme of "compensation" will therefore occupy a conspicuous place on a Service Department program. Many States through special commissions now are making an exhaustive study of accident compensation and their reports will soon be readily obtainable. The object of any plan should be to avoid all litigation and to extend the maximum of relief, care and consideration to those injured and their dependents.

At the present time many large corporations who have been operating 25 years or more, are paying pensions, but few outside of the railroads have a well defined plan. There was a time when every worker was a prospective employer, but in these times, while opportunities are numerous, comparatively few of the rank and file are ever likely to rise to positions of large responsibility. Under these conditions, there is a need to guarantee to the faithful worker some provision for the future when long service shall receive a well earned rest. The age at which workers should be retired and the length of service required to qualify for retirement are matters for careful consideration, and may vary in different industries.

No matter how liberal a pension allowance may be, its object is to avoid poverty in old age, supplying the necessities of life, and not to provide luxuries. Hence the importance of encouraging thrift among the employees by the institution of a Savings fund, so that the accumulated savings of years may provide the comforts a pension cannot do. Those employees, too, who are thrifty are the most permanent and progressive, and being careful of their own funds, they will the more readily co-operate with the management in preventing waste.

A Savings fund should be safe—that is, if operated by a business house, Trustees should be appointed to administer the funds, which funds should be guaranteed by the firm. These Trustees should be empowered to loan money to employees in need at reasonable rates, and also to those who desire to build or purchase homes. The use of such savings in the operation of the business is inadvisable, but employees could be encouraged and assisted to purchase the company's stock.

In the Education of employees the Service Department will have a large problem, but it is a problem that in its solving produces wonderful results. If we can take the workers that come to us and instruct them thoroughly in the work they have to do, and in addition increase their knowledge of the business so that their earning power will also continue to increase, we shall have accomplished a great deal, but if we can still further instruct them in health and right living that their value to the community may become greater, we shall have accomplished far more, and will have rendered an inestimable service to our fellows.

In Recreation our duty is rather to "foster" than to "originate." All suggestions regarding recreative features should come from the employees themselves, as only in that way will success result. Baseball and football teams, various clubs, both athletic and social, are all good in drawing together workers in the same plant.

The work of such a department along such lines as are above outlined cannot fail to be of permanent value in increasing the loyalty, co-operation and efficiency of the force.

CO-OPERATION.

HARRY D. THOMAS, Secretary, United Trades and Labor Council, Cleveland.

Most employers, social and welfare workers, in seeking to do things that will improve the conditions of the workers employed in the shops and factories, apparently forget that they are dealing with human beings, and go about the matter in much the same way as if these workers were the machinery or some other part of the plant.

Live human beings want something to say as to the improvements that are needed for their benefit, and when things are done for them without consulting their wishes, the employer need not be surprised if some of them resent and refuse to accept the new conditions handed down by some one who imagines he is the Superior, and on account of his superior knowledge, of course, must know better than the one to be benefited, what that one wants.

Workers, whether men or girls, should be permitted to organize and encouraged to discuss for and amongst themselves the conditions under which they work, and each one should be free to express himself or herself on all matters that concern their welfare and suggest such improvements as in their opinion will tend best to satisfy their requirements as employees.

Sometimes it is the new man or girl that comes into the factory, who can suggest the best things to be done, and where men and women are free, and the club of fear of losing their *job* is taken away, these suggestions will come freely.

Bad Air Problems

The serious danger to health and life attendant upon *bad air* and insufficient ventilation is so universally recognized today that the authorities in all civilized countries are exercising the limit of their power to arouse the thinking public and compel the unthinking to adopt or create sanitary breathing conditions. Statistics show an appalling percentage of deaths caused by bad air diseases. Some authorities place it as high as 60%.

John B. Andrews, Ph. D., Secretary of the American Association for Labor Legislation, in his address before the Thirty-seventh National Conference of Charities and Corrections at St. Louis, makes the following statements relating to ventilation:

"In the development of our civilization from the individualism of savagery to the modern complexity of industrial society, we have created many perplexing social problems. When individuals worked singly and in a very real sense "minded their own business," it was usually possible for the individual to adjust himself or his surroundings to personally agreeable conditions of temperature, moisture, *fresh air,* and nervous or physical strain. But when factories were built and large numbers of people came to work under artificial conditions over which they themselves had little or no direct control, there was created a very different problem. Conditions of temperature and humidity and *purity of air* and labor strain, are often prescribed by the most convenient, the most rapid, and the cheapest process of manufacture from the standpoint of selfish or thoughtless employers.

"The protection of the health of the factory laborer is not a question alone for the individual worker. It is a social question demanding social regulation through legislation. The recognition of this fact has given us a century of labor legislation, but it is only within comparatively recent years that we have begun to approach the problem in a scientific way. Miners in the coal fields of Westphalia are restrained by legislation from working more than six hours a day in temperature in excess of 84 degrees. In few instances there is legislation designed to protect weavers from the evil effects of excessive moisture. In several countries and states a minimum standard of *purity* is established for the *air* in certain departments of different trades. This is a complicated and difficult problem for in many trades there are processes which fill the air with poisonous fumes, *and the mere rebreathing of the air in crowded, poorly ventilated workrooms is fraught with dangers not yet commonly appreciated."*

The problem of sanitary ventilation is a complex one. First, there must be an ample supply of fresh oxygen to replace that used up in any given space. Second, the by-products of this oxygen consumption and other waste products must be carried off. This is a comparatively easy matter, but just this is not sufficient. In addition to the important items of temperature and relative humidity, there are very important factors that are elusive and almost impossible of accurate measurement, such as odors due to emanations of the body, decaying organic matter, processes of manufacture, etc. A room may contain sufficient oxygen, have the proper degrees of temperature and humidity and yet be unbearably stuffy or close or smelly—call it what you will, it is a condition which not only militates against comfort and happiness, but which is fraught with danger to health and which naturally reduces human efficiency. Various nerve centers are affected by these conditions: in some it produces a tendency to nausea, in others headache,

nearly always lassitude. The normal functions of the body are impaired, anaemia, indigestion, etc., result. There may be plenty of so-called fresh air, but the air is *dead*—those who breathe it feel dead also, their minds and bodies do not work to good advantage. Employers do not get the maximum efficiency from their employees. Employees are retarded in their advancement by *less* work and poorer work, than they could and would perform if they possessed their normal energy instead of feeling tired and dispirited.

Blow all the air *permissible* into a densely populated office or factory. Exhaust all the *bad air* you can. Do this by all means, but you only lessen the evil, you only dilute, you do not get an ideal result, you do not destroy the impurities created every minute by the occupants of the room. You only partially remove or dilute them by forced draught. Theoretically, it should suffice to supply an amount of oxygen per hour equal to that consumed per hour in a given space. In practice this is far from sufficient, as an excess of air is required to mechanically remove "smelliness". This means waste. To try to remove all the noxious odors mechanically by forced draughts would not only increase this waste but create impossible conditions.

It has been satisfactorily demonstrated that the harmful impurities in air are largely due to decaying or decayed organic matter. Such decayed matter is not only unwholesome and malodorous, but it is the natural food for bacteria. Its elimination, therefore, would materially decrease the bacteria contents of air by producing a condition unfavorable for their existence and multiplication. Since the mechanical movement of air is but an incomplete remedy for *bad air* troubles, we must needs call to our aid some other agent to obtain the desired results.

It is obvious that the chemical destruction of decayed organic matter, of odors and bacteria would fulfill all requirements, provided the chemical agent did not prove injurious to the human system.

Many years of careful research and experiments by eminent scientists have shown that ozone properly applied seems to purify air, destroy decayed organic matter and odors, and check the growth of bacteria. This is true when ozone is provided even in light concentrations. The benefits of ozone Purification from a health standpoint and from an economic standpoint are also a matter of record. Installations in offices and factories, both in the United States and in Europe, have given satisfying results in that the productiveness of those affected seemed to be increased solely because of improved health conditions.

Ozone is a possible remedy for *bad air* conditions; it supplies *quality* where ventilation supplies *quantity* alone. It is an adjunct to ventilation. It has no substitute—what ozone does cannot be done by any other means.

The ozone engineer is the latest specialist of the engineering profession. His field of endeavor is almost limitless and his problems are many and complex. Their solution will require very special training and the co-operation of chemists, physicists, physiologists, and bacteriologists, as well as thorough knowledge of electrical and mechanical engineering.

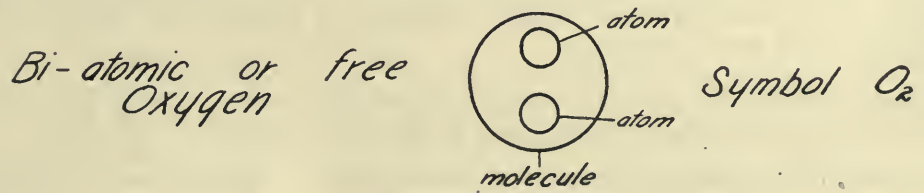
It would be difficult to describe the characteristics of a reliable ozone ventilating machine without falling into the domain of advertising, as there are at present but two reliable makes in the United States, each having its characteristic merits, each suitable for different applications.

It would likewise be difficult to lay down any set rules for the application of ozone in ventilation as no two *bad air* problems are alike and each must be solved according to attending circumstances. The mere purchase of an ozone generator, no matter how excellent, does not insure desirable results. The quantity of

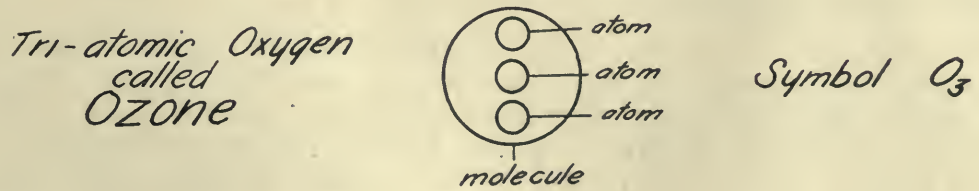
ozone liberated must be commensurate with the amount of work for it to do. A smaller space may require more ozone than will in other cases be required by a large space. These and many other complex details make the ozone engineer's task a delicate and responsible one. He must deal only in *facts* and not in opinions or fancies. He must produce *results* that are *tangible, measurable.*

Testimonials over the signature of men prominent in finance and business have been circulated setting forth the alleged advantage they had derived from ozone, whereas as a matter of fact the apparatus they had purchased was producing either nothing at all or else a negligeable quantity of ozone and a noticeable quantity of nitrous oxid. These cases of imposition are deplorable and multiply the difficulties that confront the ozone engineer by creating distrust in the efficacy of ozone itself. Other failures have resulted from the misapplication of even good apparatus. In one case, the manager of a large establishment was favorably impressed with an ozone generator, believed in the fundamental value of ozone, but frankly confessed that, after a thirty days' trial, he had derived no benefit therefrom in his business. He consulted an ozone engineer who carefully analysed the situation, applied the ozone correctly and produced the desired a by-product. In the absence of anything oxidisable, ozone slowly returns to results in the air conditions. The manager became an enthusiast on the basis of work actually done by the ozone.

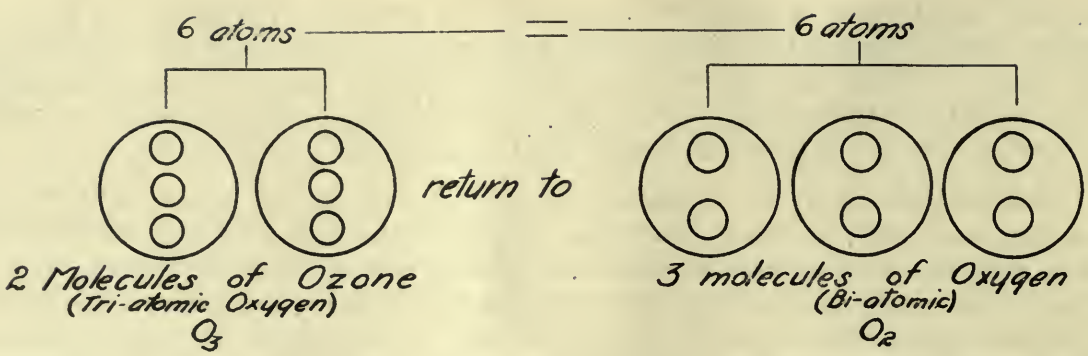
A few words as to what ozone is and what its properties are may prove interesting: Ozone is simply ozygen in another form, oxygen to which additional energy has been imparted; whilst this energy lasts, it is capable of doing useful work; when this energy has been spent there remains oxygen and some oxid as a by-product. In the absence of anything oxidisable, ozone slowly returns to oxygen. Wherever we find free oxygen in nature, as we find it in air for instance, the oxygen is bi-atomic, that is to say, each molecule of oxygen contains two atoms.



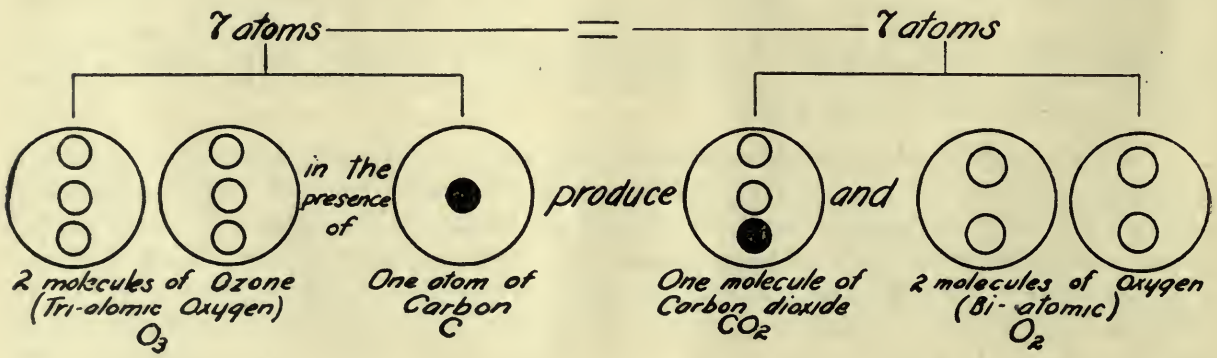
When oxygen is energized each molecule takes on a third atom and we have tri-atomic oxygen or ozone.



but this form of oxygen is unstable, the third atom is loosely combined and is anxious to free itself, thus restoring the normal balance of Nature. It may free itself, by recombining with other "third atoms," restoring the normal balance, thus:



or if there be present some oxidisable substance such as carbon, for instance, (C) the third atoms quickly combine with it, thus forming a by-product, carbon dioxid (CO_2) and free bi-atomic or normal oxygen—thus:



Ozone being oxygen in its most active form is, therefore, the most powerful oxidizing agent, and so has innumerable applications.

Ozone has a characteristic odor hard to describe—to some it suggests the odor of freshly ironed linen, to others it suggests chlorine, to those familiar with it, it suggests only pure fresh air.

Ozone is absolutely non-poisonous, its peculiar odor disappears when it combines with substances which it oxidizes or when it returns to oxygen.

It is soluble in water only to a very small extent. Certain oils, however, retain it.

It is the most powerful deodorizer known.

In high concentrations it is an absolute bactericide and disinfectant, as well as a powerful bleaching agent.

In the hands of a physician it performs wonderful cures owing to its bactericidal and oxydizing properties.

The fragrance of the air after a thunderstorm is due to ozone; breezes coming over large bodies of water or through pine forests are fragrant with ozone, but as ozone is always present in pure air, thunderstorms offer but an inadequate explanation of nature's processes of production. The exact manner in which ozone is produced in nature has not yet been satisfactorily demonstrated. Many conflicting statements have been made and many contradictory theories have been advanced.

In an interesting article, entitled "The Atmosphere of Cities," published in the *Scientific American Supplement,* of July 6, 1907, H. Henriet, an eminent

French physicist, reviews the various theories on nature's processes in making ozone, and concludes as follows:

"From experiments yet unpublished I conclude that the southwest wind brings to the ground air from the upper regions of the atmosphere. Rain probably has the same effect. Hence it may be inferred that the ozone is formed in these upper regions, probably under the influence of solar rays or of the silent electric discharge that may go on incessantly in highly rarified air, as has been proved by Bouty's experiments on the limit of the dielectric state in gases."

He also reaches another significant conclusion, stating the following criterion of a pure atmosphere:

"The atmosphere of a place is free from impurities generated by human agglomerations if it always contains more or less ozone and never shows a trace of deoxidizing gases, especially formaldehyde."

The bibliography on ozone is not wholly satisfactory as far as its applications to ventilation are concerned. Current Engineering Periodicals, however, contain some interesting and reliable data: in the Chemical Engineer, Vol. 22, No. 3, September, 1910, published in Chicago, there appears an able article by W. Oscar Linder, Chief Chemist, of the Western Electric Co. In the Engineering News, Vol. 63, No. 17, April 28, 1910, appears another interesting article on the application of Ozone to water purification.

JUVENILE EMPLOYMENT IN BIRMINGHAM.

From Daily Consular and Trade Reports, January 26, 1911.

The British Parliament, on November 1, passed an act granting powers to local educational authorities to furnish information, advice, and assistance to boys and girls under 17 years of age.

Investigation in the city of Birmingham has shown that numbers of children leave school at 14 to enter occupations that do not train them for future work and are more or less temporary, and who, on approaching manhood and womanhood, are discharged to make room for young children, and, as a result, become useless or objectionable members of the community. In many cases also, there is considerable delay between the time when a child leaves school and an occupation is obtained, while frequently the occupation is unsuitable. As in the city of Birmingham alone some 8,500 children leave the schools annually, the safeguarding of so large a number of future citizens is a matter of vital importance to the community. The plan does not contemplate exercising minute and continuous supervision over children with responsible parents.

The employment bureau to be provided will be part of the British Board of Trade national employment system, and all expenses connected therewith will be met by the Board of Trade.

Further information regarding this work may be obtained by addressing a friend of "Human Engineering," Mr. Albert Halstead, American Consul at Birmingham.

THE SUGGESTION SYSTEM.

MIRIAM BIRDSEYE.

It is by this time no new idea that the healthy worker is a more profitable worker than the ailing or anaemic one. It is not unusual to find concerns who feel that they owe it to the individual employee to increase, or at the least not to impair that soundness of body which is the worker's first and best capital. It is a newer trend of thought that the employer has also a duty to the State in the matter of his people's health. In view, however, of the fact that a larger and larger proportion of our population is being drawn into industrial pursuits, it becomes evident that the citizenship of the future is destined to bear increasingly the factory trade mark, and we must accept the conclusion the factory management has a responsibility of a broader nature than that which it has hitherto recognized toward the business, or even toward the individual employee.

If this larger responsibility be granted in the case of the healthy body, it should be recognized as equally compelling in the case of the sound mind. A State cannot long remain stable and progressive if the minds of an increasingly large proportion of its citizens are stunted or onesidedly developed. Our present industrial system, with its minute division of labor and its schemes for increasing speed, tends to narrow the worker's range of vision, and to center his attention upon the repetition of a single operation until this comes to be performed in a wholly mechanical manner. What then is to provide for the factory operative of today the mental exercise absolutely indispensable for the preservation of a sound mental health? Unused muscles become flabby and finally shrivel and stiffen. So do unused minds. A shriveled and stiffened mind is bad enough in a factory employee; in the citizen of a State which exists by and for the people it is a public menace. If for no other reason than to discharge its obligation to the State, the factory management must see to it that it furnishes some opportunity for mental exercise to the citizens whose thought life, through their daily sojourn within its walls, it so largely controls.

Almost all progressive concerns have sought in one way or another to furnish to their employees that mental pabulum which the simple repetition of the daily task does not of itself supply. Probably the most obvious and natural means, because immediately connected with and springing from the routine which tends to strangle thought, is the so-called "Suggestion System." Whatever the ultimate object in the mind of the management, the effect upon the employee of a carefully planned and consistently carried out suggestion system is to supply him with a new interest in his work, a definite incentive to analyze his job and the conditions under which he finds himself, and a satisfactory means of getting his ideas promptly valued by a tribunal whose judgment he respects and whose approval—since he is but human—he covets. The importance of this last result cannot be over-emphasized. Interest which lacks a proper channel for expression soon evaporates; and one or two experiences, at the outset of a factory career in which the worker finds his initiative checked and his ideas cold-shouldered, are enough to make even the most enthusiastic and original person subside into a resentful silence, which soon settles down into the mental inertia of the "what's the use" attitude.

An optimist takes all the lemons that are handed to him and makes lemonade out of them.

THE BONUS SYSTEM.

WARREN S. STONE, President Brotherhood of Locomotive Engineers.

The Brotherhood of Locomotive Engineers is opposed bitterly to the so-called bonus system and stands ready to fight it at any time at any stage of the game. But you say, "Oh, well! this is simply a fight between labor organizations and the employers, and the public at large are not concerned in this at all."

The theory of a bonus system is a beautiful one.

But no one would think of hiring a man to drive rivets by the hundred on a steel skyscraper. No contractor, no matter how reckless, would dare think of such a thing. You demand that the workman do it by the day with the very best skill possible. The steam locomotive is subjected to more strain and more demanded of it under more varied conditions than any other class of machinery. The fatality of engineers is bad enough under the most favorable conditions. We paid for two hundred and ten men killed on duty during the year just closed. We have a right to demand the very best material and workmanship possible. We don't want piece work and we don't want the bonus system with its attendant incentive for some man to slight his job. It is something of vital importance to you as well as to me.

Human nature is much the same the world over, regardless of whether the man is an employer or an employee, the result is, in any system of bonus, merit, or premium, call it what you will, there is always someone who will not play the game square.

The labor union is not opposed to the efficiency of its members. There is nothing in this talk about the labor union keeping down the individual workman. The American workman is the peer of any other workman in the world. It is true he lives better and has many privileges that workmen in other countries do not enjoy. It is also true that his output is better than any other workman in the world. This is an era of progress, and this talk about the individual workman making an individual contract with his employer in accordance with his efficiency is the rankest kind of nonsense. Perhaps in the days of the old regime when an employer used the labor of only a few workmen, it might have been possible, for then the workman worked side by side with his employer and often formed part of his household and was in close personal touch with each employee. Today the employer uses thousands of workmen and does not know who the employee is. He merely represents one cog in the machine, and one number on the pay roll, and when you talk about that man getting in as an individual employee to make his bargaining he has about as much chance as he would getting into Heaven by climbing up the fire escape.

Many employees are women. Why is it in all this talk about efficiency we hear nothing about the wages of the woman who does the work of two men often times, and because she is a woman is paid one-half the wages paid to a man for the same work. A woman is just as much entitled to the same compensation for the same labor performed as any man, but that is getting away from the subject.

The labor unions are not clogging the wheels of progress. The labor union I represent stands for efficiency. The efficiency of the employee has been doubled in the last ten years. One man today is doing the work two men did ten years ago. The engineer is pulling twice as much tonnage as he did ten years ago. Our organization did not fight that; if they had not stood for efficiency they probably would have.

We are opposed to any system that cheapens the quality of work and increases the risk, and stand ready to fight it at any time."

THE HYGIENIC WINDOW.

WINTHROP TALBOT, M. D.

Good air is a test of good workmanship. If an office is so arranged as to be stuffy or smelly, poor work and ill temper, indolence and carelessness may be looked for with a good chance of their being found. Even carefully constructed buildings of the latest model architecturally are often arranged so that offices are insufficiently supplied with fresh air. It seems strange that men of intelligence and alertness in matters pertaining to dollars and cents, and versed in methods of control and management, accustomed to study all conditions affecting profit and loss, should be thoughtless and often ignorant concerning the quality and nature of the air by which their thoughts and actions are directly influenced.

Men complain of poor health, of their tendency to take colds, to have headaches, to suffer from indigestion, lapses of memory, inattention, impaired power of concentration, when nothing in the world is the matter with them except that they are staying most of the day in a cooped up office, breathing over and over again the fragrant incense emanating from their own bodies and their friend's cigars.

If anyone opens a window, however, in the hope of making conditions a little more bearable, there is a growl, and some one exclaims: "What a draught!" Any office can have good atmosphere by providing for a flow of air through the room. Gases, even more than fluids, intermingle freely, and by giving a chance for warm air to escape at the top of the room, cooler air will enter from below if an opening exists. Foul air gathers mainly in the warmer strata. This is no scientific theory, but it can be proved by anybody in any warm room by taking the trouble of placing a chair on a table and then standing on the chair. You can compare for yourself the quality of the air in the top of the room with the air in the lower layers. The air in the upper layers is particularly bad if many people are working in the office or anyone is smoking. Draughts consist of clear cut currents of air, and no one likes them, but everyone feels more comfortable if the body odors which every human being gives off, are swept away by steady air currents.

In the first place, then, it is necessary to arrange our windows so that air can come in from outside near the level of the face and make its exit at the top of the room. In nine hundred and ninety-nine windows out of a thousand the shades are so arranged that they cannot be in use and yet allow air to pass through the top of the window. In other words, the shade is hung at the top of the window frame and drawn down over that part of the window where it is least needed. The lighting of a room in any event should be from the upper part of the window, and nothing should obstruct a free ventilation when the upper sash is lowered.

Two hundred years ago, speaking of strawberries, Bishop Berkeley, cautiously remarked, "Doubtless God could have made a better berry, but doubtless God never did." The author does not claim that this method of office ventilation advocated by him is necessarily ultra-excellent and beyond improvement, but it is the best he has been able to devise and it satisfies his more critical friends. The illustrations show clearly the method adopted.

In the first place the shades are hung in the center of the window frame so as to work from the center toward the top and to the bottom, two shades being provided for each window. This permits of absolute control of the lighting of the room, especially from the upper part of the window, where most needed,

and for opening the window at top and bottom without cutting off circulation of air or wearing either the shades themselves or the temper of the worker by their constant flapping. The method of fixing these shades is given in such detail in the drawings that it needs little in the way of verbal description.

The automatic catch pulley at the top of the window holds the upper shade at any desired point.

The next important device is a screen to fit the window frame outside the upper sash made twenty-two inches wide, of wood and fine copper mesh, fifty or sixty wires to the inch. This will allow air to filter in without draughts, except in winter, when it should be reinforced with a piece of white cotton cloth, or a light green or yellow cheap China washable silk in plain colors, can be provided, where color tone is desired.

When a moderate breeze is blowing, if a candle be placed within a yard of this screen, the flame will not be cut. In cold weather when there is a decided difference in temperature indoors and out the wire must be reinforced by the cloth; in summer not.

A third device should be a piece of plate glass, wood, or even Bristol board, held in grooves at each end of the lower part of the window. There should be a fly screen also of twelve mesh to the inch for the lower part of the window. This may be permanent or not, according to preference.

To repeat:

(1) Windows should be supplied with shades drawing from the frame up to the top and down to the bottom.

(2) Fine wire mesh screen for the top of the window.

(3) A piece of plate glass or board across the lower part of the window.

(4) A fly screen for the lower sash.

Perfect ventilation can be obtained by raising the sash from the bottom slightly when the piece of plate glass will act as a deflector, cooler air will be blown in and upwards to the top of the room, whence it has a tendency to settle. With the window at the top open, heat will not be rapidly conveyed, if the screen is arranged so that there is between the cloth and the wire a layer of air which permits of free passage of air, but acts as a non-conducting layer for the transmission of heat.

An alternative method, better in some cases, is to provide a second screen for the lower window, in which case the plate glass or deflector may be dispensed with. The cost of this outfit will be repaid scores of times each year by increase of work and the allaying of that irritation which comes from air starvation. Questions as to details will be answered.

INSIDE VIEWS



Both shades rolled up in center—windows closed

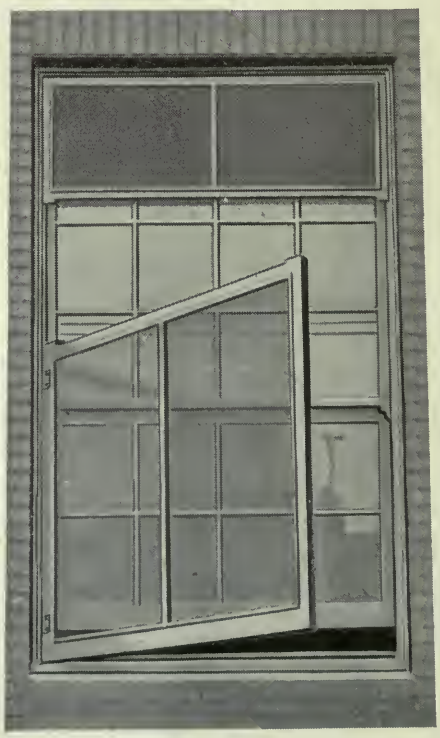


Upper shade raised, lower shade lowered —window open for ventilation without draft

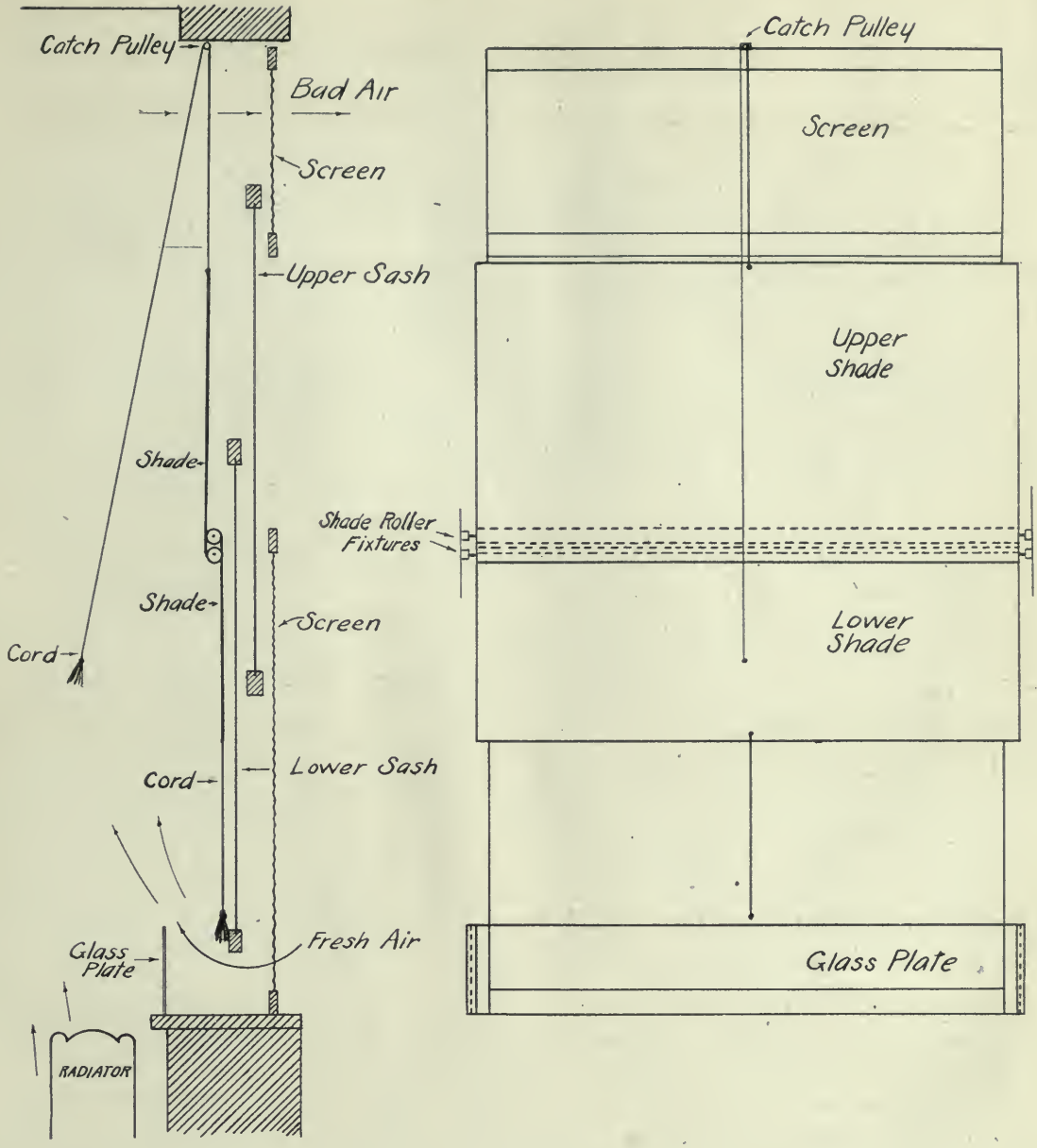
OUTSIDE VIEWS

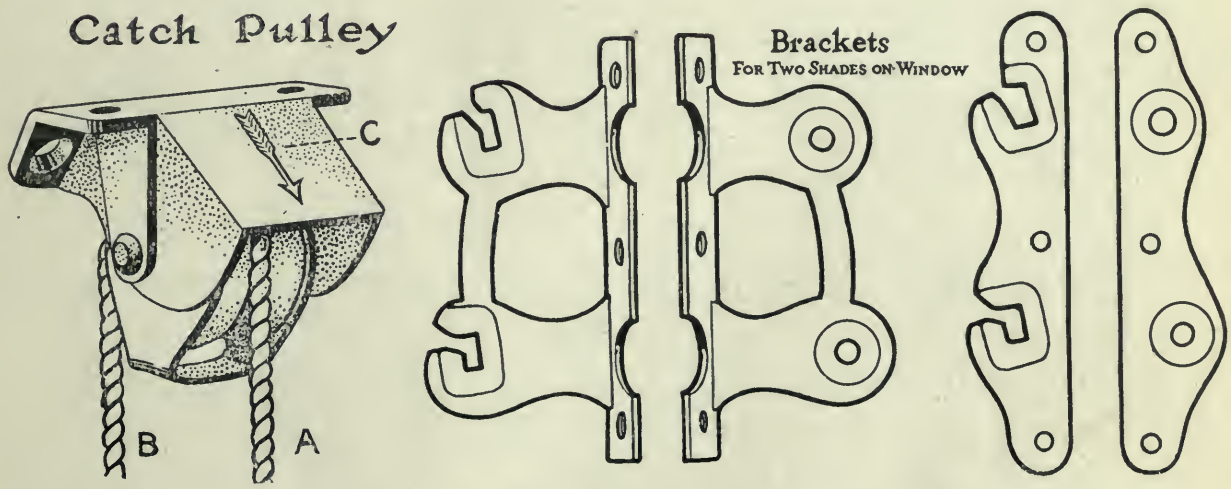


Showing screens in position



Showing lower screen swung open on hinges to allow window cleaning





Plan of Fixtures, Shades and Screen for Hygienic Window

Experiences

PROFIT-SHARING IN DETROIT.

By A. A. Boutell, President Detroit Graphite Company, Detroit, Mich.

The company was organized for the manufacture of paints in 1892. The business commenced on a small scale and with few employees.

This company has never experienced much difficulty with its workmen, the principal source of annoyance being occasioned by "floaters," or men who were content, after earning a little money, to stop work until it was spent, and then secure employment elsewhere.

One of the greatest factors in the success of our manufacturing enterprise is the good-will and loyalty of its employees. Some ten years ago the company evolved a profit-sharing scheme for the benefit of its employees, based particularly upon the length of their service. For instance, at the end of the year, employees with five years or over of continuous service to their credit received five per cent on their yearly wages; those of four years' service received four per cent; three years, three per cent, and so on. The officers of the company are of the opinion that this arrangement has had much to do with its success. In case an employee left the service of the company, and afterwards came back his previous service was not considered in the profit-sharing plan, but his participation in it was based on his service from the time of his re-employment.

Each year the employees have been accustomed to raise a fund among themselves, which was presented to some other employee or an officer of the company at the time of the distribution of the profit-sharing fund.

For many years a Christmas entertainment has been given by the Company and the employees, in which the officials and employees participated in an equal way. Short informal talks are made by the officers and men, and in every way the best of feeling is fostered among all concerned.

This year, for instance, a sumptuous luncheon was served in the factory dining room, which had been especially decorated for the occasion. First a short talk was made by Mr. William Johnston, for many years connected with the company. The president of the company then responded in a talk on "Team Work," after which the annual profit-sharing fund was distributed by him, with a few words of commendation to each employee. After luncheon, a novel part of the entertainment was the "Fish Pond," from which each one present drew a present; a group photograph was taken; musical selections were rendered, and everyone had a good time.

A PRACTICAL EXPERIENCE WITH THE FORTY-EIGHT HOUR WEEK.

Wylie M. Carhartt, Vice-Pres't, Hamilton Carhartt, Manufacturer, Detroit, Mich.

In our Detroit factory we employ some seven hundred girls in the manufacture of men's working garments. Many of these girls are of foreign extraction. All of them are piece-workers. Some months ago, we decided to reduce the

total working hours of the week to forty-eight, reasoning that in order to equal their former earnings for the ten-hour day, the operatives would apply themselves more closely and so approximate the total output for the longer period. To our surprise, the output of the eight-hour day not only equalled but exceeded that of the former ten-hour day, and this state of affairs has continued up to the present time. We have thoroughly satisfied ourselves, from a business standpoint, of the superiority of the forty-eight hour week. We find that not only has our output increased, but that our working force is more efficient, loyal, and stable than before, and that in the labor market we have an advantage over concerns which adhere to the longer hours.

Incidentally we may mention that the short working day in this factory gives the girls an opportunity to attend educational and social clubs held under the auspices of our social secretaries, an opportunity which they do not seem too weary to appreciate and enjoy, as is too often the case when the longer working day prevails.

LEARNING A NEW PROCESS.

FLORENCE H. TRESILIAN, M. D.

In learning a new process, we may be guided by observing the development of a normal child, for children are but little men and women, and similar methods apply in all manner of unfoldment. Years ago it was thought necessary to teach the three R's "to the tune of the hickory stick," but today educators seek teachers who can maintain harmonious relations with the pupils. We notice in the school-room, if the teacher does not hold the attention, confidence, and sympathy of the children, they do not make good progress, and often fall below the requirements.

So with adult pupils in the workshop, there will follow inefficient work, carelessness, and accidents, if relations are disagreeable between the working girl and the forewoman. Work without the incentive of emulation, approbation, and praise, gives no pleasure, and work without pleasure is, humanly speaking, unprofitable. This is entirely apart from just remuneration and sufficient pay. Workers should have a desire to excel—a desire which will be fostered mainly by just conditions of labor and by kindly expressions of appreciation.

To secure the best results, care must be taken to make physical conditions right. Attention should be given to ventilation, because pure air makes one feel energetic. The body must be well nourished with sufficient food to supply nervous energy. Is it reasonable to expect concentration when air is bad and the needs of the body are not met? When a person must force himself, unduly, to work under a condition of fatigue, it is at a loss of energy and effort.

Like other natural gifts, the power of concentration must be cultivated, and a person's efficiency depends upon his degree of attainment. Methods of development must vary with the individual, for what will hold the attention of one will be wholly uninteresting to another.

The most eminent teacher of music the world has ever known, Theodor Leschetizky, by constant observation and careful inquiry into all manner of methods and ways of obtaining results at the piano, drew certain general conclusions which apply with equal force to learning any process in industry. One of the deductions is that complete concentration must be maintained during the practice hour. In music a phrase must be played once, twice, and at most three

times, every detail of time, fingering, pedaling, etc., decided upon instantly, and the whole then played with surety and expression, *from memory*. By beginning with only a measure or two, and concentrating the entire thought on that measure, it can be memorized at once. Any pupil of ordinary ability can commit measures to memory by few repetitions. The modern idea is less keyboard work, more mental work. Each succeeding effort at complete concentration makes the next one easier. It is not the number of hours of practice that raises a pupil above the average, but his success springs from thoroughness and rapidity united with control of the attention and will.

Knowing the surprising results produced with students by experienced teachers, leaders in the various industries are applying similar methods and are trying to bring to the attention of superintendents, foremen and forewomen the necessity of mental training in the workroom. If the whole attention of the learner of a process in a factory can be fixed and held under control by the power of the will, he will more quickly gain thoroughness and facility.

Working along these lines a factory may not only exhibit more skillful work, but in every department will be men and women of higher mental development.

POINTS AND HINTS FROM THE INDUSTRIAL SECTION (Volume 8) OF A MONUMENTAL GERMAN WORK BY TH. WEYL, M. D., ON HYGIENE, WITH COMMENTS BY THE INVESTIGATOR, CEPHAS GUILLET, PH. D.

Left to himself the workman almost always lives irrationally and un-economically. (This applies particularly to the buying and cooking of foods; much might be done to assist the wives of workmen in this direction.)

German statistics show that the product of labor on Mondays is 20% to 25% less than on other days! and that on Mondays and Saturdays by far the greatest per cent of accidents occur. (If the accidents occurring on Saturday show the influence of overfatigue, what can be said of the German worker's wisdom in spending his weekly holiday? We in America have as yet gathered no statistics on this subject, but would either employer or employed venture the opinion that our experience in this matter would prove very different from Germany's?)

There is more tuberculosis in cities than in the country. (Should not this fact be taken into consideration by employers of labor in selecting sites for factories? and if the factory is in a city, would it not be to the employer's advantage to see that his employees live in sanitary dwellings and surroundings? The location of factories has not in the past been selected largely with a view to health. And yet health is money just as truly as "time is money.")

People who work in the open air are less subject to lung-diseases than those who work in rooms. Many statistics are given. (In this connection it is pertinent to mention an experiment being conducted in Chicago and Washington. In the latter city, for example, in one of the rooms in one of the Public Schools, no artificial heat whatever is supplied, and the windows are all opened as wide as possible and kept so. The pupils keep warm by keeping their outer garments on. The writer of these notes had a conversation the other evening with Ex-Surgeon General Sternberg, who is actively interested in this experiment. The General said that the experiment is proving a great success. The better

oxygenated blood of these pupils is seen in their color, in their energy, and in their work. Indeed, the idea is becoming quite popular and they will soon be obliged to extend the plan to other schools.)

The effect of various industries on the development of the body is given in statistical tables. Textile workers (especially in wool) are particularly unfortunate. The death-rate in various industries is also given, and the disease-rate, with particulars as to the special diseases to which various industries appear to make one liable. (Undoubtedly this morbidity might be lessened if not certainly eliminated did we know the exact causes therefor in each industry. Is this not a practical question?)

As to the hours of labor, a proper day's work cannot be determined off hand. It depends on the nature of the technique, the complexity of the machine and the speed at which it is driven, as well as the condition of the workman as regards age, health, etc. Workmen sometimes do 50% more work during the first half of the day. (Is it economical to work a man after he is really fatigued? If we should not "drive a willing horse" should we overwork a "willing man"? Work done in a state of fatigue is badly done; the liability to mistakes and accidents is increased. But the whole question is complicated and a matter for expert scientific determination—like most other matters. Let the workman have patience. Many employers are interesting themselves in this problem and solid efforts have begun towards its solution. It is of the first importance to know the facts, and to this end all connected with our industries, employers, foremen, employees, can help.)

The relative harmfulness is given of the *poisonous* fumes and of the *dusts* produced from various materials used in industry. The dusts are dangerous in the following order:

1. Metal dust.

2. Glass, stone and slate dust (including quarrymen, masons, potters, porcelain-workers, etc.)

Then come mother of pearl, horn, wood, hemp, jute, horse-hair, sandstone, rags, silk and last, i. e. least injurious of all, coal-dust. In general the more pointed and sharp-edged the particles of dust are the more injurious the dust to those who breathe it in. (Here, then, is evidently one of the causal factors in the varying disease and death rates of the various industries. The dust and fume problem is one of the chief problems of industrial hygiene.)

Other dangers to which workmen are exposed are: excessive variations of temperature, glaring light, excessive heat, increased air-pressure, vaporous air, over-exertion of particular parts or organs of the body, alcoholism, infection, and *bad air.*

The last mentioned is the chief and most widespread danger—namely, long exposure in closed spaces to the devitalizing effects of air vitiated by the poisonous exhalations through the organs of breathing, and the skin and the clothes of many companions, frequently with too small an air-space, also, per workman.

This is another capital problem, and perhaps the most important of all in most industries. Something more may be said of it in the next issue.

Monthly Review

A SIGN OF THE TIMES.

The following extract from the address on "Occupational Diseases," delivered in Chicago last June by Prof. Charles L. Henderson before the First National Conference on Industrial Diseases, is quoted as a hopeful sign of the times. It bears significant testimony to the truth of the assertion that we are growing more and more eager to know the truth, and to so apply it to our own daily living and to our relations with our fellows as to set ourselves free from the toll which ignorance and prejudice never fail to exact.

"It is manifestly impossible for us to report at this early date any final results of our investigations, but we can already see that in one field at least our services are appreciated. Already representatives of the trade unions have preferred requests that we furnish them brief, plain, practical directions for the working men in different trades, so that they may be able to avoid disease. Employers also begin to see that we are not making an attack upon them, but that we are in a position to render them valuable service.

LEGAL STATUS OF TRUSTS IN GERMANY

(By Consul General A. M. Thackara, Berlin.)

Daily Consular and Trade Reports, Jan. 25, 1911.

The commercial tendency of the present time is toward concentration of capital and enterprise. I believe that in no country in the world has there been greater development of trade combinations, understandings of one form or another, than in Germany. Trade combinations which have been in existence for many years, are extending their influence and new ones are constantly being formed.

A cartel or trade syndicate is defined by Liefmann as a "combination for the purpose of maintaining the competitive power of its members, notwithstanding their varying individual facilities, against the advantages enjoyed by monopolists" by means of—

(1) Obtaining a uniform maximum selling price for products.

(2) By the creation and maintenance of a normal and rational demand for materials and labor.

(3) By creating a monopoly for every member or for every group of members in each branch of production.

The "Selling Agreement," a cartel or convention under which the manufacturers or producers of a certain article or class of products agree not to sell their product below a specified minimum price agreed upon by all members of the cartel and changed from time to time in accordance with the varying cost of production and general requirements of the market. These rather losely organized combinations were the original type of German trade syndicates and served their purpose very well in prosperous times, but in periods of depression and diminished demand it was found difficult to hold certain members to the agreement, and it was decided to adopt a more binding form of organization and put the business of selling under direct control of a central authority.

This led to the creation of "Sale Syndicates" in which all members of a cartel pool their products to be sold through the ministrations of a central committee, which besides fixing the selling price apportions among the members orders as they are received, in proportion to the capactiy of each, the quality of the merchandise ordered, and the conditions of transport.

The third class includes the real trusts or closely organized syndicates, which absorb and take up the shares of the original corporations, issue new stock, and consolidate the whole management under the absolute control of a central authority.

There is no particular requirement that a cartel or syndicate shall obtain a charter from the Imperial or State Government or file in any Government office a copy of the contract or protocol which forms the basis of such associations other than the copy required under the provisions of the general law applying to the form of company chosen. If, in the case of a "Selling Syndicate," a special central office is opened for selling the products of its several members, this office must be registered, like any other business house in the commercial register (Handelsregister) of the proper local court, and is subject to the general law governing corporations, but no other or unusual formality is imposed.

1. Legal Form.

When two or more persons or firms combine to do or refrain from doing certain things, the simplest way of giving legal expression thereto is by entering into a mutual agreement or contract, specifying the positive or negative obligations of the parties. Such syndicates or cartels are usually known as "conventionen." Negative obligations are recognized by section 241 of the German Civil Code, so that agreements to refrain from lowering prices or from selling, or producing more than a given quantity, are not necessarily illegal, certainly not on their face.

It is permissible for various kinds of companies and firms to conclude mutual contracts; that is to say, "natural persons," "partnerships," "societies in commendam," "limited companies," and "stock companies" can conclude mutual contracts among themselves, and thus constitute a cartel or syndicate by mutual contract or "convention." No special form of contract is necessary; indeed, theoretically such a contract could even be made orally.

Complete mutuality or privity of contract is, however, necessary. Each individual contracting party must enter into the contractual relation with each other of the contracting parties individually.

The "Gesellschaft des Bürgerlichen Rechts," which may be translated as "civil partnership," to distinguish it from the partnership of the commercial code, and which is defined by section 705 of the German Civil Code, is in most cases a better and more appropriate form than the mutual contract. No specific form is prescribed; the "company contract" or articles of association can be formulated with elasticity to suit the particular case, and rules may be formulated for the general management of the organization. The common purpose must, however, be one permitted by law and must not be against good morals. The foregoing form can be chosen in all those cases where the syndicate or cartel itself does not have to be charged with the immediate conduct of the business.

In the German system of law the threefold division of civil, criminal, and commercial law prevails, and consequently, if the syndicate or cartel is of such a nature that the business must be conducted directly by it, it will probably come under the compulsory provisions of the commercial code touching the registry of business undertakings, instead of under the civil law, so that the form of the commercial partnership or "Offene Handelsgesellschaft" must be adopted.

The commercial partnership or "Offene Handelsgesellschaft" is a company formed for the purpose of conducting a mercantile business. It is governed and defined by section 10 of the German Commercial Code. Notwithstanding this arbitrary distinction between the civil partnership and the commercial partnership,

they are very much alike, and, unless otherwise prescribed by the commercial code, the provisions of the civil code find analagous application.

The "Société in Commendam" is a company form of which we in the United States still have examples in Louisiana, inherited from France. This form is known in Germany as the "Kommanditgesellschaft," and it may be compared to our partnership in which the partners are divided into active partners and sleeping or silent partners.

The German "Stille Gesellschaft," which may be literally translated as "silent company," is a company form closely analagous to the "Kommanditgesellschaft," the main difference being that in this case the silent partner acquires an interest in a business or undertaking conducted by a merchant or tradesman by the contribution of capital.

These are divided into two classes, those which are designated as "rechsfähig" and those which are "nicht rechtsfähig." Roughly speaking, the German law permits various societies, clubs, and the like to exist without necessarily recognizing them as being capable of asserting or claiming rights and owing duties in the manner which characterizes other company forms. If such a society or club apply to the State for a charter and such charter be granted, it becomes a "rechtsfähiger verein," because it is the holder of a franchise.

This company form is the German equivalent of the American private corporation. It is defined and governed by the provisions of the German Commercial Code, supplemented by the provisions of the civil and criminal codes. Use has been made of this company form especially in those cases where various undertakings have found it necessary to establish and conduct a central sales office. The main distinction between this form and the preceding ones is to be found in the fact that it is a juristic person, whereas the foregoing were not; and that the principles of limited liability apply to it.

This form of company is perhaps the most popular of all. It is not to be confused with the English limited company, since the latter is the full equivalent of the American private corporation, whereas the German limited company may be termed a hybrid, partaking as it does of several of the essential features of a stock corporation and of a partnership. The following may be mentioned:

(1) It is a juristic person.

(2) It is represented by one or more business managers.

(3) The shareholders are limited in their liability.

(4) The shares are transferable, but only by a notarial or judicial act.

(5) Stock certificates are not issued.

(6) Contributions to the capital stock may be made either in money or in moneys' worth.

(7) The construction of such a company can be varied to suit almost any conceivable case and may be as simple as a partnership agreement or as complex as the charter and by-laws of a stock corporation, and it can either have a board of directors or other organs of supervision or not, as desired. This company form was created by a special imperial statute: "Gesetz betreffend die Gesellschaften mit beschränkter Haftung vom 20, April 1892, in der Fassung der Bekanntmachung vom 20. Mai 1898."

This form is well adapted to cartel or syndicate purposes. There are no restrictions as to residence or nationality of the members of such a company, and they may be either natural persons or juristic persons. It is perfectly possible

therefore for any number of undertakings existing in various forms each to delegate a representative to cooperate in forming such a limited company. A company so formed can act as a central office for receiving and alloting orders to its members, receiving payment, regulating prices, and dividing dividends. Balance sheets do not have to be published, and the resolutions of members may be made either in general or in special meetings, or if unanimous, they can be made without any meeting at all by simply being put in writing and signed by all the members.

2. Position of the Cartel or Syndicate in German Jurisprudence.

Text writers in Germany agree that cartels and syndicates have a recognized place in jurisprudence, and that they do not per se offend against the principles of freedom of industry and commerce.

The German Civil Code, paragraph 138, says that a transaction which offends against good morals is void. The forming of a cartel or syndicate is not held to come under this paragraph, but when formed it may bring itself under the operation of this provision by the means which it may choose to attain its purposes, such as for instance boycotting, the cutting of prices with competitors to such an extent as to bring about the financial ruin of the latter, misuse of their monopoly and franchises, and the like. Concerning boycotting, there are decisions of the Imperial Supreme Court in the years 1903 and 1906 on this point.

The Supreme Court at Leipzig decided in the year 1904 that a stricter moral standard must be applied to cartels and syndicates; that is, that they must be held to a stricter accounting for the moral quality of their acts, because of the preponderance of economic interest which they represent.

3. Law of Unfair Competition.

There exists in Germany a statute touching unfair competition (which is known as "das Gesetz gegen den unlauteren Wettbewerb." Paragraph 1 of the above law consists of a general clause) to the effect that whoever is guilty of transactions in industrial dealings which offend against good morals may be held liable in damages. The German word is "handlung," which is usually translated by transaction or act or the doing of something, since it usually has a positive sense, but the text writers, and also the courts, agree that to refrain from doing a thing is also a "handlung," or act which, although of a negative character, still falls under the operations of the law in question.

It may, therefore, easily happen in the case of a conflict between a syndicate and an outsider, that certain acts, or "handlungen," may take place offending against this law, and in such cases the law affords a fair remedy against the offender. This is really the only special German statute which approximates to our law and statutes touching the restraint of trade and unfair competition.

The provisions of the statutes touching unfair competition are supplemented by the provisions of the civil code relating to the awarding of damages. It seems to be the opinion of the text writers that the existing legal provisions and principles give to outsiders and to the public in general sufficient protection against an undue use or misuse of syndicate power. Some text writers even go so far as to maintain that the cartel or syndicate is actually unduly handicapped before the courts, simply because it is supposed to be big and powerful.

Special Legislation.

Some years ago special legislation touching syndicates was contemplated, but the general consensus of public opinion did not seem to indicate that the necessity

for such a measure was then sufficiently great, and it has never become law. At present there is no indication of further legislation, nor does the public at large, the Imperial or State Government feel the necessity for taking any other action than such as can be taken under the existing rules and principles of law to prevent the misuse of trusts and combines.

As a matter of fact, the law is not directed against these combines per se, but against any misuse of their powers and franchises where such can be proved, and the principles and rules touching good faith and the moral quality of business transactions can be so strictly applied as to give to the public sufficient guaranties to insure it own protection.

Bibliography.

1. GENERAL LAWS.

German Civil Code (Bürgerliches Gesetzbuch). An English translation prepared, it is believed, under the supervision of Mr. Draper-Lewis, has been published in Pennsylvania.

German Commercial Code (Handels-Gesetzbuch). English translation by B. A. Platt, published by Chapman & Hall (Ltd.), London.

German Criminal Code (Straf Gesetzbuch).

Law of Unfair Competition (Unlauterer Wettbewerb), June 7, 1909.

Law of Limited Liability Companies (Gesetz betr. Gesellschaften mit beschränkter Haftung), April 20, 1892, with the amendment of May 20, 1898.

II. TEXTBOOKS, COMMENTARIES, ETC.

Silberberg, Handbuch des deutschen Kartellrechts, 1910; Puttkammer & Mühlbrecht, Berlin.

Liefmann, Kartelle u. Trusts, 1910; Heinrich Moritz, Stuttgart.

Huber, Die Kartelle, 1903; Stuttgart and Leipzig.

Grunzel, Ueber Kartelle, 1902; Leipzig.

Tschierschky, Kartell u. Trust, 1903; Göttingen.

Baumgarten u. Mesleny, Kartelle u. Trusts, 1906; Berlin.

Calwer, Kartelle und Trusts, 1906; Berlin.

Monthly publication, "Die Kartellrundschau;" Thierschky, Karlsruhe.

German Iron and Steel Industry, by Special Agent C. M. Pepper, published by Bureau of Manufactures; 1909.

III. SPECIAL WORKS.

Bonikowsky, Der Einfluss der industriellen Kartelle auf den Handel in Deutschland, 1907; Jena.

BECAUSE HE COULD HANDLE MEN.

The January number of SYSTEM contains an article entitled "Because He Could Handle Men." It is a sketch of the career of Clarence S. Funk, now the general manager of the International Harvester Company. Mr. Funk started out, at eighteen, as a clerk in the general offices, and in less than twenty-five years has risen to his present position. The principles and methods which have made him a successful captain and leader are well worth studying. We quote some of the most significant paragraphs of Mr. Casson's article:

In his own opinion, self-control is the first of all business virtues. "I noticed very early in my experience," he said, "that the man who loses his temper loses his case. To be fit for a place of authority, a man must be the ruler of himself. Many a time, when I have been aggravated right up to the point of explosion, have I thought of that Bible verse—'He that ruleth his spirit is greater than he that taketh a city.'

"It is sheer folly to act in the heat of passion. If I receive an angry letter, I do not answer it at once. I wait a day, or sometimes several days. I give the writer time to cool off and to be sorry. Angry men cannot do good business. If two of my men quarrel I talk to each one separately and then bring both together. I assume always that the main problem is to help the business as a whole, and in this way it is usually very easy to harmonize them.

"To handle man, they must be treated as friends and co-workers, not as automata. In a crisis a manager must be *decisive*. This is the crucial test of leadership. The iron hand must be there when it is needed, or the whole organization will be demoralized. But I very seldom give an arbitrary order. I outline what must be done, and then let the men who are concerned work it out. This is better for them and better for the company. It is as necessary for men to be self-reliant as obedient. I do not drill them to say 'yes, yes' and 'no, no'. I do not suppress individuality but rather encourage it.

"A large working force must be encouraged and guided rather than driven, and a wise manager takes his captains into his confidence. He gives them full credit whenever they deserve it.

"How to fix and hold responsibility upon each man—that is the problem; and it is one that requires tact and sympathy and resolution. A true leader of men must have imagination and enthusiasm, as well as facts and figures.

"The best way to win loyalty from men is to be absolutely fair. By the dignity of the office you may compel obedience, but that is not enough. You must get every important man to take a partner's interest and to work like a partner. An employee cannot have the same feeling of personal loyalty to a big corporation that he had to an individual employer. Therefore we must appeal to his self-interest. In fact, I believe that an ideal corporation is one in which the head of every department is a shareholder in the business. Once this step has been taken, dozens of smaller difficulties will disappear."

It will be interesting to read Mr. Funk's charge to the Welfare Board of his own company, extracts from whose proceedings last December we publish elsewhere in these pages. These are the words of a man who recognizes to the full the value of human engineering to a successful business.

"In the beginning of civilization a sullen man in an arid field faced his accuser with the question—"Am I my brother's keeper?" That question has been asked in all ages and in all countries since. It is a question which will continue to be asked, and which is going to demand an answer from generation to generation. I don't

think the International Harvester Company is going to impose upon us any sentimental burdens as the keeper of its brothers, but I know the officers and the directors and the managers of our company do feel this—they do feel they have a responsibility which reaches down to the humblest employe in our plants or upon our payroll, *and it is a responsibility which our officers and directors are not going to be content to have met in any half-hearted way. They are going to hold these men here, these members of the Welfare Board to a full accountability, not for sentimental results, not for actions nor results outside the scope of pure business, but for results which are inside the scope of pure business; for results which are going to make our company what we are all determined it shall be, and what it has a right to be,—make it a leader among the industrial corporations of this country, and not only of this country, but of the world.* Now, the officers and directors cannot accomplish this alone. They can lay down the policy, but the Welfare Board, which is in close touch with these problems, comprises the men who must be looked to to carry out these policies in good faith. You are carrying them out in good faith. You are doing very much better than you thought you would in the beginning; you have taken hold of it in a broad gauge manner. You have applied business methods to it, and you are working it out in a way which I think is a credit to the company you represent."

THE SURVEY.

87 Dearborn Street, Chicago. Published weekly, price 25 cents.

The first number of the January "Survey" has an interesting article on "Fires, Factories, and Prevention," by Peter J. McKeon. It describes the recent Newark disaster and points out the great danger from fire which exists at the present time. It suggests that the subject be taken up by the public and a war waged against the present fire conditions, just such a war as is being waged against tuberculosis.

In the same copy, Mr. H. F. J. Porter suggests a new style of fire-escape with the lowest ladder lowered and adjusted by means of a weight and pulley. By this device the ladder can be lowered quickly and with very little effort.

He also urges the necessity of frequent fire drills, involving the test of fire apparatus so that the employees and apparatus may be depended upon in time of fire.

W. Jett Lauck has written a sketch entitled, "Industrial Communities." In this he tells how the immigrant, coming to America, soon becomes a member of one of these communities, a truly foreign community in which American manners, customs and laws are practically unknown.

An editorial article on the "Conservation of Eyesight" deals ably with a matter of public interest. The passing by Congress of the Esch Bill, prohibiting the use of poisonous phosphorus in the manufacture of matches is also discussed in this editorial.

"The Chicago Strike Ending" and "How the Engineers' Strike was Averted" are discussed by Graham Taylor in the monthly "Industrial Survey."

GERMAN EXPERIMENTS WITH UNEMPLOYMENT INSURANCE.

Whenever in this country we begin to discuss the wisdom or the feasibility of a system of compulsory insurance—as for instance, the question of compensation for industrial accidents, which will probably be brought before every State

legislature this year—it is to the experience of Germany that we turn for suggestion. As early as 1881, Prince Bismarck began a campaign for compulsory insurance against sickness, accident, and old age on the part of all persons whose incomes were below a certain figure. At first there was much opposition to so radical a program, but twenty-five years of experience with compulsory insurance have amply proved the wisdom of the Iron Chancellor's measures. Furthermore, practically all the progressive nations of the Continent have adopted in more or less detail the German system. When, therefore, we find German cities experimenting in painstaking, thorough-going German fashion with still a fourth form of compulsory insurance, namely that against unemployment, and when we learn that the Imperial Government is seriously considering the adoption of national measures on the subject, we may surely give the matter our attention.

Up to the present time, sixteen German cities have attempted to solve the knotty problem of insurance against unemployment. In a significant article in the January Scribner's,* Mr. Roberts outlines briefly the methods which Cologne, Strassburg and Leipsic have adopted, and shows in each case what success has attended the venture. These municipal systems are strikingly different in detail. but the principles upon which they are all based and the main conclusions which may be drawn from all of them are strikingly identical. To Anglo-Saxons both the philosophy and the conclusions have a foreign ring, but their soundness has been shown by the success which has attended their working out. Mr. Roberts' article sums up in an illuminating fashion the reasoning which leads the German citizen to accept as a matter of course measures which to Anglo-Saxons smack of extreme radicalism.

The German argument runs somewhat as follows: In these days of immense organizations the individual worker is no longer completely responsible for his situation in life; through events which he has no power to control, the industry to which he looks for employment is subject to crises and depressions. Therefore, the State or the local government must jointly share the responsibility for employment, and must devise measures to create a fund ouf of which the unemployed may *of right* take assistance. The individual worker is to be regarded as the labor unit of the State and as a simple matter of self-preservation the State must see to it that while temporarily out of use, this unit shall not deteriorate. Neither circumstances nor the individual's own inadequate powers of resistance must be allowed to transform him into a parasite. His spirit must be kept in a healthy state of self-respect and courage by the assurance that in case of need he is backed by "the whole of the splendid and powerful Society of which he is an obscure member; that he has a right to expect that he will not be allowed to become submerged utterly, no matter what calamities may happen to him individually or to his trade."

It is by such a course of reasoning that the use of public money for the purpose of an unemployment insurance fund appears not only justifiable but expedient; and the experience of individual municipalities has amply proved that such insurance is technically possible. The goal toward which German statesmen are moving is the building up of a governmental machinery that shall bring about *compulsory thrift* on the part of those liable to unemployment; *compulsory contribution* by the employee of labor and an addition by society as a whole to the fund thus created.

There are many difficulties in the practical working out of such a scheme. Some of these are pointed out in Mr. Roberts articles and the remedies adopted by the various municipalities are shown. The subject is interestingly and ably discussed, and the article will repay careful reading.

*Experiments in Germany with Unemployment Insurance, by Elmer Roberts, in Scribner's Magazine, Jan., 1911.

LIMITATION OF WORKING HOURS FOR WOMEN.

Mrs. Florence Kelley, Secretary of the National Consumers' League, contributes to "The Survey" for January 21st, an article on the "Limitation of Women's Working Hours." She emphasizes the urgency of legislation upon this subject in the thirty-six legislatures to hold sessions in 1911, and notes the fact that the Southern Conference in Women's and Children's Labor is pledged to introduce bills on this subject in nine southern states. For several years judicial decisions have upheld the constitutionality of state laws limiting working hours for women. It has recently become the custom of the Consumers' League in all cases pending where the constitutionality of a statute has been in question, to place at the disposal of the court in a brief prepared under the direction of Louis E. Brandeis, the common knowledge on the subject in relation to public health.

The common goal toward which legislation will be urged is in substance: A six days' working week, with a maximum of sixty hours; abolition of night work; six o'clock closing in texile industries and not later than ten o'clock in others; a maximum working day of ten hours, preferably nine or eight; a short Saturday, not depending upon longer hours on other working days; the posting in conspicuous places of the hours of work prescribed in the factory; no industry to be exempted in text of bill; title of bill to contain every subject mentioned in the text. The League is expecting the co-operation of trades unions, workingmen's assemblies, and the New York Child Labor committee, in forming public opinion on this subject.

PSYCHOLOGY OF BUSINESS.

A series of suggestive and interesting articles on "The Psychology of Business" has been running in System since March, 1910. The January, 1911, number contains the ninth installment. The articles are written by Walter Dill Scott, Ph. D., director of the Psychological Laboratory of Northwestern University, and they make practical common sense application to the problem of managing men of the laws which govern thought and emotion.

A list of the topics discussed in these extremely readable articles is given below:

March, 1910—Increasing Human Efficiency.

April, 1910—Imitation—Spur to Efficiency.

May, 1910—More Man Power Through Competition.

June, 1910—Making Employes Say "We."

July, 1910—Focusing on the Day's Work.

August, 1910—Putting Men in a Mood to Work.

November, 1910—Wages, I.

December, 1910—Wages, II.

January, 1911—The Love of the Game.

CHILD STUDY.

In an article entitled "Child Study" by Prof. E. A. Kirkpatrick in November, 1910, of The Popular Science Monthly, the following ideas and facts are brought out. A great waste of human life is caused in deaths and injuries caused by preventable disease and accidents.

An immense waste of human energy by idleness and misapplied effort. Morality is shown to depend to a much greater extent than was formerly supposed upon proper housing, feeding and recreative and social opportunities. Especially, is careful study of the child's education, urged along lines of more individual instruction to those whose talents or natural bent do not fit in with the prescribed course. The author urges the necessity of the government establishing a bureau to study and direct this important element of our national life. In the last congress a bill appropriating $1,500 for child study was defeated, and immediately afterward $15,000 was appropriated for studying clams.

He believes that child study is even more important than the study of facts concerning adults and should receive at least as much and preferably more attention from the government.

EFFICIENCY.

Mr. Harrington Emerson, the efficiency engineer whose writings have attracted such widespread attention, needs no introduction. One of the most significant series of articles recently published is his "The Twelve Principles* of Efficiency," now running in The Engineering Magazine. This series began in June, 1910, and will be completed during 1911. The topics so far discussed have been.

June—Industrial Lessons from Germany and Japan.
July—The Organization Necessary for Industrial Efficiency.
August—The First Principle. Clearly Defined Ideals.
September—The Second Principle. Common Sense.
October—The Third Principle. Competent Counsel.
November—The Fourth Principle. Discipline.
December—The Fifth Principle. The Fair Deal.
January—The Sixth Principle. Reliable, Immediate and Adequate Records.

SMOKE PREVENTION.

To those of us who see in the clouds of soft-coal smoke which hang above so many of our Western cities a menace and an affront, Professor Switzer's article* comes as a relief and an encouragement. "Smoke prevention is waste prevention. Show a manufacturer that by ceasing to contribute his quota to the city's smoke he can make an appreciable saving on his own coal bill, and he will give you a respectful hearing. Smoke prevention in the future is to be attained, doubtless, by the installation of boiler plants properly designed to carry on smokeless combustion, and strict prohibition of the erection of any other kind; *but those of us who are alive today are interested in the immediate abatement, or at least the immediate amelioration, of the smoke nuisance.*" Experiments, carefully carried out under Professor Switzer's direction at the University of Tennessee indicate that even with "the ordinary return-tubular boiler set directly over and quite close to the grates, and fired with bituminous coal, a smoke-consuming device, operating on the principle of injecting, by the use of automatically controlled steam jets, an adequate supply of heated air into the combustion chamber whenever by reason of adding fresh fuel the increased air supply is needed, astonishing results can be obtained." The article gives methods and figures in detail; only its conclusion, however, can be quoted here: While

without the use of "smoke consumers" the boiler cannot be driven up to 80 per cent of its rated capacity without producing dense black smoke, the use of the jets permit it to carry 105 per cent of its rated capacity with entire absence of objectionable smoke.

ENGINEERING MAGAZINE, DECEMBER, 1910. Switzer, J. A.

VENTILATION.

Mr. Gilbert's article emphasizes to employers the fact that proper ventilation raises the efficiency of the worker, and that an adequate ventilation system is a positive money asset to every employer. Giving as the essentials of adequate ventilation the removal of the waste products of respiration, the supplying of oxygen in sufficient quantities, the removal of dust, odors, fumes, and gases, and the regulation of temperature and humidity, Mr. Gilbert argues the necessity for a well-equipped ventilating engineer on the permanent consulting staff, who shall not only install a system fitted to the special needs and conditions of the plant, but shall also be consulted whenever changes or additions tending to destroy that adjustment are contemplated. He points out the necessity for recording thermometers and hygrometers "located at strategic points of the ventilating system" and "provided with weekly charts to show plainly the daily and hourly condition of the air with respect to what are perhaps the two most important considerations of the effect on labor efficiency." These charts, filed with the superintendent, furnish him "an accurate index to the quality of air supplied at all times of the year, and enable him to check up his engine-room force, while they enable the designer to watch the working of his system and to locate trouble readily." Many well installed systems, Mr. Gilbert asserts, have been discredited because they have never been properly operated.

RANKIN TRADE SCHOOL

The Survey, in its article about the *Rankin Trades School* at St. Louis, says: "A trade school which has the commendation of employers, trades unionists and education experts, is worth more than ordinary attention."

When David Rankin endowed this school with his entire fortune of $3,000,000, he said he wanted to give boys a chance to be useful citizens, and for that reason he admitted only self-supporting pupils to the school, putting the tuition rates low within their reach.

There has been friction for some time between the trade schools and the unionists, the latter claiming the schools did not turn out efficient workmen. But now, as Owen Miller, the president of the Missouri State Federation of Labor, is on the advisory committee, the unionists have overcome their prejudice.

The Metal Trades Association sends 40 boys to this school. They pay the boys' tuition as well as the regular shop wages while they are learning, showing how highly this association considers the Rankin School.

ENGINEERING MAGAZINE, JANUARY, 1911. GILBERT, Royce W.

RECRUITING A FACTORY FORCE.

In the January number of "Business" Franklin Russell, of the Winchester Repeating Arms Company, tells how a big plant secures efficiency in its new employes:

"The selection of capable workmen has developed a new and very important department within the factory walls, a department not actually productive, yet so closely related to production as to make it an integral part of the works. This is the recruiting office, and its duty is to keep the plant

supplied with the best workmen the market supplies. Only concerns that have undertaken this task realize the many difficulties involved in making the department entirely efficient."

With this as a text, Mr. Russell outlines the practice of his company. A general preliminary examination, if satisfactorily passed, leads to the filling out of a carefully prepared application blank; which tends "to give both parties a good bargain. The man whose record shows up to advantage has a pretty well defined standing even before he enters the company's employ."

The applicant is seldom hired at the time he applies: first, because, by reason of their recruiting system the company is not likely to be caught short handed, and second, because it desires to confirm the applicant's statements by reference to his former employer. For this inquiry there is a special form, containing questions which, when answered, give the company an accurate idea of the applicant's ability.

The cards so verified are then filed by date under the department and job for which the applicant is fitted, and thus constitute "the available supply, the labor reserves of the plant."

"The worth of this method of enrolling applicants has had too long proof to leave it open to argument. It is a personal service examination as effective in its purpose to secure capable and reliable employes as any civil service test. It has become almost a fad among some business men to declare they pay no attention to recommendations, that they are able to judge any man after three minutes' talk with him; the only fair thing to do is to give the man a chance to prove himself. And it's a fine thing to give a man a real chance; but often the chance proves a handicap because the man is thrust into work for which he is unfitted or untrained. * * * To be fair to the employe as well as himself it is usually better business for the employer to know the facts rather than to estimate the chances."

A SIGNIFICANT GATHERING.

Extracts from the proceedings of the annual meeting of the Advisory Board of Welfare, International Harvester Company.

MARY LATHROP GOSS, Secretary.

Probably the most conspicuous gathering of the year in International Harvester Company circles is the meeting of the Advisory Board of Welfare.

* * *

It is unquestionably noteworthy because of the purpose—the object—the extension of ways and means for developing industrial efficiency through consideration of the human element. This is the broad definition of welfare work as the officers of the Harvester Company look upon the subject, and look to the board for interpretation.

High standards of working environment, and high ideals for the "spirit in the game," are principles to which every member of this Advisory Board is committed, and theirs is the responsibility of extending this welfare propaganda all along the line.

* * *

Every superintendent in the force was present except one, who was unavoidably detained in New York.

A brief verbal report was made by the chairman, showing continued interest on the part of the executive officers of the company, increasing development in the subject throughout the country.

* * *

Suggestions, corrections, committees, guards, rules, education, inspectors, co-operative plans all came in for a place in the illuminating discussion on how to make the plants more safe for the workers, and how to reduce the percentage of accidents which, in spite of all the increased care and installation of devices, is higher than could be wished. The particular machines which cause the most trouble were pointed out. One superintendent said he thought everything was guarded in his entire works, but every little while some small matter would crop up and they would make another trial. One superintendent reported that his safety inspector had totaled $26,000 spent during the year, and accidents unpreventable apparently, still occurred. From the Twine Mill superintendents' reports came of guarding the flyers, and sure, if apparently slow progress. Of 1,700 flyers in one mill the superintendent reported only four left unguarded, and these will be taken care of by the end of the year. Another superintendent reported two men working eight months on one kind of guarding, and six men on general work, and still something to be done. Out of sixty-eight accidents reported on a weekly record, only one could have been prevented by better protection. The ratio of accidents must be reduced by other co-operative measures as well as by safety devices.

* * *

Detailed reports to the superintendents of all accidents, with committees to consider the cause and the removal of the danger or carelessness; these committees frequently change and "keeping everlastingly after it," all are active methods of locally working out the same principle and purpose to reduce preventable accidents to a minimum.

In grouping the suggestions for discussion at the meeting, the secretary found that the forty-two topics named by different superintendents and officers were all phases of the following subjects: Protection, Sanitation, Education, Co-operation, Stability, Lunch Rooms, Recreation, Housing, Sickness and Death Benefits, Improvements in Sanitary Installations, Purity of Drinking Water, Protection Against Spread of Tuberculosis, Health of Workers as affected by dust from grinding machines or fibre were considered.

Profit-sharing—bonus, premiums, and suggestions—plans were discussed.—*Harvester World, December, 1910.*

Human Engineering

WINTHROP TALBOT, M. D., Editor

A Magazine for Employers published to provide a means of exchanging Experiences on the Human side of Industry and a Forum for the discussion of the Conservation of Human Energy

PUBLISHED QUARTERLY

Subscriptions Should be Sent to Human Engineering, Station B, Cleveland

RATES

One Dollar a Year Twenty-five Cents a Copy

Volume I **APRIL, 1911** **Number 2**

CONTENTS

EDITORIAL	
WHAT BOSTON AND NEW ENGLAND ARE DOING FOR THE PROMOTION OF INDUSTRIAL ECONOMICS	ROYCE W. GILBERT
IS THE CO_2 AIR TEST A FALLACY	
VENTILATION IN WORKROOMS	WINTHROP TALBOT, M. D.
VENTILATION AND PUBLIC HEALTH	
FACTORY SAFEGUARDS	LUTHER D. BURLINGAME
THE NEW POSTAL SAVINGS BANKS	
MUTUALITY	W. A. GRIEVES
IT DOESN'T PAY	EDGAR A. GUEST
SANITARY, SAFE AND COMFORTABLE WORKING CONDITIONS	GEORGE W. BROWN
AN ANNUITY SYSTEM FOR EMPLOYEES	MAGNUS W. ALEXANDER
ON FILE	JOHN KENDRIC BANGS
LABOR EFFICIENCY BETTERMENT	FRANK BURGESS
A HUMAN PRESERVATION INSTITUTE	
SUMMARY OF REPORT ON CONDITIONS OF WOMEN AND CHILD WAGE EARNERS IN THE COTTON TEXTILE INDUSTRY	VIOLET A. WHITTEMORE
INDUSTRIAL EDUCATION IN CINCINNATI	FRANK B. DYER
"CONCERNING COURTESY"	L. W. COTTRELL
ACCIDENTS DUE TO SWIFT-MOVING MACHINES AND THEIR AUTOMATIC RATIONAL PREVENTION	WM. T. MANNING, M.D.
TWO YEARS OF SUCCESSFUL WELFARE WORK	EMMA S. BRITTIN
SOME PRINCIPLES UNDERLYING A SUCCESSFUL SUGGESTION SYSTEM	F. G. HALDY
ANNUAL MEETING OF AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE IN PHILADELPHIA	THE SURVEY
A SOUTH AMERICAN EXAMPLE	J.H.W., N. Y. EVENING POST
QUARTERLY REVIEW	
PRELIMINARY DIRECTORY OF FIRMS WHO HAVE ESTABLISHED METHODS OF INDUSTRIAL BETTERMENT	E. E. PRATT WINTHROP TALBOT, M. D.

Editorial

Human Engineering is published as a quarterly review of co-operative efforts in industry, as a medium for the spreading of information and for exchange of ideas and experiences in the relations of employers and employed. Here and there throughout the land there have been single employers who have recognized the practical value of justice and healthful conditions for work. In the inevitable combinations of business interests many firms are forcing now upon the public an intense consideration of the principles underlying co-operation. We are learning that consideration for others, courtesy, generosity and justice can be measured in terms of dollars and cents and result as a credit to "Profit and Loss"—in other words they are not expenditures that can be charged to "Expense" but contribute largely to "Direct Labor." It is through the workingman that the employer derives his profits. The human element is the most important factor in his organization. Many ideas and ideals commonly accepted in business five years ago are being scrapped today in every leading industry. Just as we are trying to prevent tuberculosis, typhoid fever and cancer by sane living, sanitation and hygiene, we are likewise realizing that labor disputes, strikes, boycotts, lockouts, misery and poverty can be prevented and should be prevented by better business methods.

Good Business of yesterday was cost and production. It did not conserve. Good Business of to-day is more. Its scientific requirements are not satisfied with waste in any form. Waste in property, equipment and material is bad. Human waste is worse.

Good business requires conservation in machines, but above all in human machines. Human conservation in industry is a world-wide movement. This country is now feeling the transition from the old school to the new. To realize the best from this movement, two things are required—publicity and co-operation.

Above all, good business realizes more than ever the money value of co-operation and emulation in place of antagonism and competition.

Human Engineering is published not in the pride of possession but from the necessity of acquiring knowledge of men and business manners. Born in a spirit of humility it is now baptized with the waters of chastened exaltation. For in the three months preceding its first issue in January last there had been published in seventy periodicals but thirty articles dealing with the

relations of employer and employed. In the three months following the first issue of Human Engineering we list one hundred and fifty articles—an increase of five hundred per cent, due plainly to the emergence of Human Engineering upon the journalistic horizon! Roosevelt, railroad rate decisions, Pinchot, Efficiency engineers, Brandeis, an archaic Sherman Law, Ballinger, muckrakers, workman's compensation for injury, industrial education, the general craving for wider distribution of the fruits of labor, may also be enumerated as secondary and subsidiary causes for this literary orgy. By this generous public acknowledgment that other agencies have been at work, Human Engineering therefore is acquitted of incurring the entire responsibility for all active endeavors in bettering industrial conditions. We are certain that while the same result might have been accomplished by it single handed and alone, it would have taken longer.

Our self-depreciation is like unto that of Benjamin F. Butler, when he was Governor of Massachusetts. Coming down the State House steps to Beacon St., he noticed two lawyers in earnest disputation. He stopped and inquired as to the point at issue.

"We'll leave the question to you," they both exclaimed. "We were disputing as to who is the greatest lawyer in Massachusetts."

"I am," said Ben Butler.

The lawyers looked nonplussed for a moment, and then one ventured to ask, "But how can you prove it, Governor?"

The Governor fell back upon his knowledge of the law.

"I don't have to prove it," he said, with dignity. "I admit it."

The meeting of the Metal Trades Association in New York in April was characteristic of the present general awakening of interest among employers concerning conditions of labor. Two days were spent almost wholly in considering Industrial Betterment, Compensation for Injuries, and Industrial Education. Through the courtesy of the Association, Commissioner Wuerst and the contributing members, our readers will benefit from several valuable articles read at this meeting.

Another notable meeting was held the week preceding by the Academy of Political and Social Science in Philadelphia. An excellent abstract of its proceedings, written for The Survey, is reprinted in our pages as a matter of record as well as of public interest.

The four numbers of Human Engineering will serve as a year book or annual review of the field of industrial betterment. We have spent "laborious days and studious nights" in collecting a list, partial in nature, but as complete as it can be made with present information, of manufacturers and wholesale employers who are using up-to-date methods with employees. It is hoped that we may be able to publish in October a supplementary list far

more numerous, as each week we learn of firms who are waking up to the economic value of good business methods in their relations to workers.

We shall publish in each issue a review of articles in the periodical press, on action adopted by various industrial organizations of interest to our readers. To facilitate study we have devised a progressive reference index so that if the numbers are kept and bound, subscribers at the end of the year will have a volume which will record the achievement and progress of industry in fostering better human relationships in employment and management. A suitable binder will be forwarded to each subscriber if requested.

Human Engineering is distinctly Melioristic in its outlook. It has not much use for Optimism—it does not believe in painting the lily or refining pure gold. On the other hand it has less use for Pessimism, as it does not believe in polluting the clear waters of thought with the dye stuffs and outscourings of philosophic mental waste. It does believe, however, that the dawn of a better social day has already come, and never again shall we descend into the depths of the barbarism of the past, which existed through ignorance and the prevalence of a gospel of "Every man for himself and the devil take the hindmost."

What we shall accurately and scientifically term INTENSIVE CO-OPERATION is an inevitable result of social growth, and the spread of the economic teachings of the Nazarene. The man or woman, and especially the woman, who thinks to live and to do business as an individual merely, careless of the rights of others and of civic responsibility will inevitably be crushed to the wall. The typewriter, telephone and telegraph are annihilating time and space and bringing all the world into closer touch. The good of each is bound up in the good of all, and this applies to the family, the factory, the shop, the department store, the town, the city, the state, the nation—yes, let us say the world.

We believe that business men are ruled by sentiments of right and justice. When their actions belie them it is because of lack of education, and unfortunate environment!

We believe in representative government and that our government is becoming more representative and better as our business men take a more personal part in it.

We believe in the growing greatness of our industrial democracy.

We believe in that regulated co-operation which makes wages higher, products better, prices lower, and profits larger. We believe in helping the other fellow to help himself.

We believe in the AMERICAN INDUSTRIAL IDEA.

WINTHROP TALBOT.

What Boston and New England Are Doing for the Promotion of Industrial Economics

Royce W. Gilbert.

A year and a half ago the Boston Chamber of Commerce, then purely a Grain Exchange, united with the Boston Merchants' Association. Shortly after the union, the organization appointed committees on various subjects of importance relating to the industrial expansion of New England. Realizing the reputation for harmful conservatism earned for many New England industries in the last two decades, the new organization appointed the livest, most progressive men in the community to these committees and gave them the strong and unanimous backing of the entire new organization. The progressive members of the new Chamber realizing thoroughly the great importance of the comparatively new science of economic production have, during the past year, devoted considerable energy to the furthering of the personal efficiency of industrial operatives. A number of strong committees having this increased efficiency as their object have been out an entire year working principally on preliminary reports. Such committees are those on Industrial Relations, headed by Mr. E. A. Filene and including in its membership such men as Louis D. Brandeis, Henry S. Dennison, and Henry C. Metcalf; the Prevention of Disease Committee, headed by Dr. Richard C. Cabot, including in its membership Dr. W. J. Rosenau, Dean of Preventive Medicine at Harvard; and that on Wage Earners' Insurance. These committees have at heart the welfare of the industrial operative and at the end of their first year in office, in connection with their annual reports have presented clearly outlined plans of the next year's work. Quoting from these reports, the committee on Industrial Relations expresses its purpose as follows: "To aid and improve the conditions under which industry is carried on, especially those which affect the relations between employer and workmen. Many evils which now exist can be remedied to the advantage of employers, employed and the public. We are therefore endeavoring to gain an understanding of these causes of difficulty and then to study and recommend corrective measures which we consider fair, sound and effective."

The committee on Prevention of Disease expresses itself as follows:

The function of the committee is:

1. "To undertake the investigation of city and industrial health conditions with the object of advocating or opposing the carrying out of health measures with the view of insuring the prevention of disease dangerous to the public.

2. Suggesting means to employers of labor whereby disease can be prevented in their establishments, which means saving of money.

3. Advising methods regarding the changes necessary to make industrial establishments more healthful and the lives of employees more secure."

The committee on Wage Earners' Insurance, has devoted itself to endeavoring to promote the extension of savings bank life insurance in the following ways:

"First, by interesting employers in the proposition with a view of their establishing agencies. Second, by interesting savings banks with a view of their opening insurance departments."

These committees have been active throughout the year in all lines of work affecting the general productive efficiency of employees. Certain special topics have been gone into quite deeply. The question of compensation for industrial accidents was gone into in the first few months of activity, it being unanimously decided that the present laws were conducive to great delay, waste and injustice, that the injured did not receive a proportionate return for money expended by the State and by individual employers. The Chamber recommended the appointment of a State Commission to study the subject and recommend general action on the report. This commission has reported after seven months' work, with the request that they be given another year in which to complete their investigations and to propose legislation.

The Chamber of Commerce has assisted the Commission with evidence and information throughout its work. The committee also made a special study of accident prevention, looking towards revision in the industrial inspection of the State. The Chamber, working in connection with the State Commission on Industrial Inspection, has arrived at the conclusion that such inspection to be effective, must be placed under control of one department; not divided among several departments as is the existing law. Also, that the subject of industrial inspection is important enough to both employer and employee to warrant the establishment of an independent State Board of Industrial Inspection. The establishment of credit unions or co-operative banking and loan associations, has also been taken up.

Plans for legislation upon the investigation and settlement of labor disputes, the establishment of preventive clinics in a number of stores and factories, of members of the Chamber, and the exposition of the advantages of savings bank insurance has been the further important work of the committees dealing with industrial operatives. Fifteen preventive clinics have been established. In large stores and factories, the employer provides a nurse who spends her entire time in the building. The services of a physician are given without charge during certain hours throughout the week. The physicians see such employees as are feeling below par and advise and instruct them in the matter of hygiene. Ventilation, sanitation, and other hygienic conditions in the establishment are also given attention.

The coming year will see the establishment of many new preventive clinics, the careful study of conditions in sanitation and ventilation upon a large scale, the inspection of many industrial plants with a view of improving certain conditions, the compiling of statistics helpful to large employers of labor, and the investigation of many of the relations of management and workmen.

IS THE C O^2 AIR TEST A FALLACY?

Dr. Luther H. Gulick in his recent tests in the department of child hygiene of the Russell Sage Foundation shows the apparent unreliability of measuring the purity of the air by the amount of carbon dioxide present. He claims that excessive heat and humidity are the principal causes of discomfort in indoor air. That an "air envelope" is formed around the body which causes this discomfort and makes one restless. When the windows are open and a rush of fresh air comes in, the relief felt is not so much from the amount of fresh oxygen and the exhalation of the carbon dioxide but from the change of the atmospheric envelope.

In Dr. Gulick's address to the American Society of Heating and Ventilating Engineers, he described his experiments and referred to the researches made by Prof. F. G. Benedict and Prof. R. D. Milner at Wesleyan University; those in the Flugge laboratory in Breslau on the question of ventilation; and those at the University of Minnesota.

Ventilation in Workrooms

WINTHROP TALBOT, M. D.

The basic principle of all ventilation is not merely that a certain amount of fresh air shall be brought into a room and the bad air expelled, but also that the air shall be brought into a room in such a fashion as to produce a steady movement of air in every part of a room where human beings happen to be or go. In other words, it is insufficient to have merely an intake of air at one point of a room and an opening for air to pass out at another. This method of so-called ventilation, it is true, is adopted frequently and produces good results in that part of the room which lies between the intake and the outlet of the air, but many parts of the room will be as slightly affected as a back eddy of rapidly flowing river is affected by the moving current. Dead water of a stream has its parallel in dead air spaces of a room. Therefore, in all consideration of ventilation of workrooms it is necessary to establsh a thorough-going cross circulation of the air. This may be done inexpensively and well if only there are windows on each side which can be opened, especially at the top, and in all factory ventilation this feature should be considered essential. If, in addition, there can be ventilating windows in the middle of the ceiling, running lengthwise of the room, perfect ventilation of any room can be established without the use of costly mechanism and ventilating devices. Especially is this true in any room where heat is employed, as in glass-working rooms. But, in order to obtain cross circulation, it is necessary, in the first place, to be able to open the windows, especially at the top. This cannot be done if the shades are hung in the ordinary manner, namely, at the top of the window frame, pulling down over the whole window.

It is better in general, therefore, that all factory rooms and executive offices be supplied with two shades for each window, hung at the center of the window; one pulling up with a cord from a pulley fastened in the middle of the top of the window frame, and the other pulling down by a cord in the ordinary fashion. This permits the shades to be used as little or as much as may seem desirable and yet allows the upper sash as well as the lower sash to be opened as freely as may be desired.

In most workrooms free opening of the windows, especially at the top is practicable; nevertheless under most conditions there is much dust in the outside air at times, and in many rooms draughts may make work difficult and unproductive. Therefore, it is recommended that the windows of every workroom be provided with fine wire mesh screens, varying in fineness from 40 to 60 mesh, which is the standard for dust protection. This will be sufficient under almost all conditions to prevent draughts.

In workrooms where there are flames or fires, it is recommended that a 40 mesh copper screen, covering one-half or one-third of the opening of the upper sash, be attached to the outer window frame and that a 60 mesh be attached to the lower frame. In winter, when the outside air is much colder, a second screen of copper or of cloth is necessary if draughts are to be prevented, and it is desirable to retain more heat.

Exhaust Fans.—Electric rotary fans, used for exhausting air, are at times the best means of changing the air in a room. It is probable that in most cases better results in ventilating by means of rotary fans will be obtained by placing them not at the ends or sides of the building but in the roof, or at the mouths of ventilators leading to the roof. For instance, if a building faces the west and a rotary fan be placed in the west wall and if the prevailing wind is a northwest wind, it blows directly against the current of air thrown out from the building by the fan, and the work of the fan is counterbalanced by the continued pressure of the wind

on the outside. This may be met by erecting a pipe of sheet iron leading upwards on the outside of the building.

Roof ventilation should be adopted also in every case when possible.

Some ventilators are of a type which is singularly ineffective. Experiments with anemometers show that on warm days there is often a downward draught through these ventilators which are supposed to carry away the warm air from within the building. Effective ventilators are on the market.

In every case where windows cannot be opened and shut freely, at the top, bad ventilation exists of necessity. Bad air is chiefly hot air and hot air rises.

Measures should be taken to see that window frames and sashes be put in such order that they can be used freely; also that in no case should boxes or frames be piled in such way as to obstruct free access to the windows.

Poisonous Fumes.—It is inefficient simply to supply fresh air and to remove foul air from the workrooms of the factory. It is essential that there should be as little artificial contamination of the air as possible. In any case where there are numbers of workers engaged in strenuous or continued occupations, the emanations from human bodies will make air unfit for breathing. It becomes doubly enervating then and is bound to affect the quality and amount of output unfavorably and wastefully.

VENTILATION AND PUBLIC HEALTH

A paper reprinted from the Annals of the American Academy or Political and Social Science on "Ventilation and Public Health," March, 1911, concludes with the following summary:

1. That all the fresh air possible should be given free access to the lungs by out-of-door living, and by natural ventilation of our habitations, breezes being less to be feared than vitiated air.

2. That artificial ventilation is absolutely essential as an aid to natural ventilation, that indoors may be kept in the best condition possible, i. e., as near as possible like out-of-doors.

3. That warm air (as distinguished herein from hot or superheated air) is equally as beneficial as cold air, lacking only in quantity, the matter of expense prescribing this limitation.

4. That the ventilating system which fails to take cognizance of the subjects of dust, humidity and temperature are foredoomed to failure, quality of air being quite as essential as quantity.

5. That efficient ventilating systems, fulfilling all of the above requirements, are available for all classes of buildings. The installation of such systems assumes the employment of experienced, independent engineers as distinguished from those connected with contracting or manufacturing firms. Efficient ventilation also involves the employment of capable operating engineers, resulting in efficiency and economy.

6. That dullness, restfulness, forgetfulness and general deficiency, being incident to a weakened vitality, are the results of the ill-ventilated school-room, while a quicker perception, improved memory, increased accomplishment, vigor, health and happiness go arm in arm with ample school-room ventilation.

7. That a lengthened illness and a lessened proportion of cures are chargeable to the insufficiently ventilated hospital, while the fresh air supplied by an efficient ventilating system is the angel of health bringing relief and healing to the weakened vitality.

8. That a poorer and a smaller output and more sick employees are the result of a foul-aired factory or mercantile establishment, while ventilation means less mistakes to be corrected, less idle machinery, and the maximum efficiency of plant and employees.

9. That the general ventilation of homes would mean less colds, catarrh and other preventable ills; and of auditoriums and places of entertainment would mean greater enjoyment on the part of the audience and an appreciable reduction in headaches and enervation.

10. That the health of the individual largely determines the health of the public. The greater necessity for special ventilation where many people are assembled is due to heat and moisture given off and to the increased oxygen required.

BUSINESS MEN'S GROUP OF THE SOCIETY FOR ETHICAL CULTURE.

J. A. STRASSER, President.

There never has been a time when employers have so clearly recognized as they do now the wastefulness of unsanitary factories, unhealthy, and unhappy workers, low wages and long hours. Recognizing the general movement on the part of employers to improve conditions, and also realizing that this movement is essential to a permanent improvement of industrial conditions, Professor Felix Adler has brought about the organization of the Business Men's Group of the Society for Ethical Culture in New York.

The primary object of this group is to establish right relations between employers and employees. The members of the group are employers, men having to do in some very intimate way with employees. These men have come together not merely for purposes of idle discussion, but in order to learn how they may improve the working conditions in their businesses; how they may best benefit their workers and how right relations with their subordinates may be established. Many of them have actually put into practical operation some of the things that have been talked of and discussed in these meetings. The lecturers and their subjects to date are as follows:

Mr. Harrington Emerson, efficiency engineer, "Efficiency as a Basis for Wages."

Mr. William D. Earnest, John Wanamaker's, "Education in a Department Store."

Professor Herman Schneider, University of Cincinnati, "Industrial Education by Employers."

Miss Jane Seymour Klink, Pilgrim Laundry, Brooklyn, "Welfare Work in a Small Business."

Mr. Edward Ewing Pratt, New York School of Philanthropy, "Welfare Work," "Profit Sharing," "Welfare Work in the Clothing Industry.

Mr. Lewis H. Brittin, National Electric Lamp Co., "The Human Side of Industrial Economics."

Mr. John Golden, President United Textile Workers of America, has discussed The Effect of the Efficiency Movement on Organized Labor.

Perhaps one of the most significant moves that the group has made is the creating of the position of advisory secretary. Mr. Pratt of the New York School of Philanthropy, who has had large experience in methods of industrial betterment and who has made a detailed study of the subject, has been engaged for this position. The creation of this position and the engagement of an advisory officer, whose functions are those of consultation and expert advice, gives a permanency and unity which promises well for the future work of the group.

The program for the immediate future is to continue the lectures along the lines already discussed, to take up other but related topics, to encourage and assist the members of the group in studying conditions in their plants and to consider the advisability of some group action looking to some definite betterment work. The real objects of the Business Men's Group are first, the study of the best existing methods of improving conditions of labor, and secondly, practical application of these methods in their own businesses.

Factory Safeguards

*By Luther D. Burlingame, Chief Draftsman, Brown & Sharpe Mfg. Co., Providence, R. I.

There are two reasons for guarding machinery; one to protect the *machine,* the other to protect the *workman,* from injury. The large majority of safeguards have in the past been primarily for the protection of the machine. An illustration of this is found in the guarding of grinding machines. The gearing and working mechanism of these machines have, since the beginning, been more thoroughly guarded than in the case of similar parts of other machine tools, this guarding being for the purpose of protecting them against grit and water. The wheel guard itself was in at the start probably provided to prevent the water and dust from flying rather than to protect the workman.

Pressure is now being brought to bear through accident insurance companies and employers' liability and workmen's compensation laws to make it financially worth while for the manufacturer to more fully guard dangerous parts of machinery to protect the workman. That such safeguarding methods will be adopted by manufacturers without compulsion, except in isolated cases, is perhaps too much to expect. I believe, however, that such a body of men as the National Metal Trades Association can have a great influence in bringing about a general condition of safeguarding, even without compulsion. This would mean the adoption of thorough measures of safeguarding in your own works and also on the machines you sell. To my mind such a course would be far preferable to waiting for compulsory legislation to enforce such safeguarding.

A great difficulty in the way is that such safeguarding means expense to the manufacturer. This expense comes in two ways, first, the direct cost of installing guards, railings and other safety appliances; second, the added cost of doing part of the work under conditions where the worker is hampered by the provisions for safety and cannot work as rapidly as by the more dangerous method.

An illustration of the first is in guarding the back gears and feed gears of a lathe. A large proportion of such gears in our American shops are unguarded. Another is the guarding of exposed gears in drill presses. If in addition to guarding such gears in your own works, you will insist that all new machines purchased shall be properly provided by the makers with necessary guards, a great step in advance will be taken. It is much cheaper for the makers to supply the guards and the job can be more neatly done, than for the user to have to provide a special guard for every different make of machine he purchases. From this it will be only a step for the makers to supply complete guards as a matter of course for all of their machines. I believe we shall soon see the time when one of the elements entering into the question of which of rival makes of machines will be purchased, will be, "Which is best guarded?"

In deciding as to what gears shall be guarded in the machine shop it is not a sufficient excuse to say, "There is no need of a guard on the back gears of this lathe because it is never used to reverse," or "those feed gears are in a protected place where no one can get caught in them." Every progressive shop moves machinery occasionally or oftener. Lathes are transferred to use in different departments and for different work. Gears which have been in a protected place may later be in an exposed place and gears will need to be reversed, which on a previous class of work had not required reversing. The only sure way is to once for all fully guard all such gears.

*Read at the annual meeting of the Metal Trades Association.

The second item of expense where the workman can not do as much work under the restrictions of safety as formerly offers a wide field for investigation. An illustration is in punch press work of a character such that hand feeding has been the ordinary practice and workmen have become expert in this method, which as usually applied requires that one or both of the hands be put between the dies for each piece. Some investigation of this situation leads me to feel that if an absolute rule is made that no work shall be handled in a way to bring the hands or fingers between the punch and die at any time, that while at first it will mean an added cost of production, in a little time ingenuity in adopting and adapting various helpful devices will in some cases bring about an even higher rate of production than is obtained by the old method, such as will offset the necessary loss in the slower handling of other jobs. The workmen, especially new men, will gradually become skilled in the new methods and in a short time with the application of Yankee ingenuity and motion study methods and a proper readjustment of the piece work rates results will follow which I believe will insure not only absolute safety but even a higher rate of production.

I believe that if the various features of danger throughout a factory are classified, taken one at a time and the condition of each shop investigated, that glaring inconsistencies and serious dangers will be found, even though in a general way the management prides itself on the attention paid to such matters. Some of the items coming under such a classification are:

1. *Guards for gears, grinding wheels, etc.* All running gearing within a workman's reach when standing on the floor should be guarded at least on the intaking side of the gears. I would here warn against partial guards which in covering the intaking side of a pair of gears brings the exposed end of the guard around to a point so much closer to the workman that the chances are much greater of his being caught between the guard and the gear than formerly between the pair of gears, thus causing more frequent, although not so serious, injury.

2. *Railing or boxing for powerful high speed belt or pulleys* near the floor. All such high speed belts and pulleys should be either boxed in or a railing provided. This should be done even when ordinarily considered safe, in order to insure against accident from slipping or falling, an accident which has often resulted in the workman's being drawn in between the belt and pulley.

3. *Projecting set screws.* All projecting set screws on revolving parts should be either guarded or replaced with a style which will not project. This precaution is most important in places within reach of the workman; also for overhead shafting having parts requiring frequent oiling or adjusting. Some of the most serious accidents occur from this avoidable cause. An added precaution is the requiring of the workmen to wear short sleeves; this feature being compulsory for the apprentices in the employ of the Brown & Sharpe Mfg. Co.

4. *Securing overhead parts against falling.* Any overhead parts which if they become loose may drop on a workman should be so held as to make this impossible.

Sufficient space should be allowed between pulleys and between pulleys and hangers for each belt so as to prevent wedging if the belt slips off the pulley. If the belt does wedge it may pull the countershaft down onto the workman.

In the Brown & Sharpe foundry the ladles are carried around the pouring floor suspended from an overhead track having switches. These switches are so made that when the switch is open a guard prevents the ladle's being run off the open end so as to fall on the workman.

A method of guarding counter-weights which might otherwise strike a workman in falling is to box them in or encase them in metal tubes.

5. *Safety stop for planers.* All planers should be provided with a safety pin to prevent the shipper lever from being accidentally operated when in its mid position. Such a safety stop is now usually furnished by the makers. It can, however, be readily applied to most makes of old planers. The only death from accident which has occurred in our machine shop within my knowledge occurred 25 years ago when a planer was accidentally started up when the workman's head was between the work and the tool. This could not have occurred if such a safety stop had been in use.

6. *Chains for hoists, etc.* Aside from the usual precautions against using chains for heavier weights than they are intended to carry, all chains should be inspected at frequent intervals by a responsible person and repaired or replaced as required. A record should be kept of every chain and its condition. Some experiments were made at our works in annealing chain after it had been in use for a length of time in order to remove any tendency to brittleness. Tests, however, after the annealing did not show that this improved the condition of the chain as compared with other chains which had had the same wear but which were not annealed.

7. *Fingers and hands between dies and shears.* This has already been discussed and I believe the only fully safe rule is that the hands must never come between dies, shears or clamps and that provision be made for handling the work so as to avoid this. The alternative is to have the press operated by a hand lever so that the workman must take his hand away from the die to operate the lever before the press can be started.

8. *Safety appliances for wood-working tools.* This class of tools includes some of the most dangerous operations and the most difficult to provide safety appliances. Some guards which are a protection for certain classes of work actually add to the danger for other classes of work.

Band saws can be fully guarded by a hinged guard covering the upper wheel to catch the saw if it breaks and by a head guard following the saw down to a point near the work. An exhaust to carry away the chips is also desirable. For circular saws and wood planers many guards have been tried but so far with only partial success. I believe the last word has not yet been said as to guarding these tools. Among the minor helps are the use of rubber mats for the workman to stand on to prevent slipping, and exhausts to carry away the sawdust so as to keep the floor and table clear. The use of padded leather aprons when using slitting saws is a protection to the workman against being injured if the block he is sawing catches in the saw and is thrown back against him; a form of accident which has often resulted fatally.

9. *Cleanliness, light and air.* Cleanliness, including the keeping of things picked up around the shop and everything in its place, is one of the factors tending to reduce accidents. Adequate light, both daylight and artificial light, also has its place as preventive measure, and fresh air, which not only keeps the workman in better condition for work, but also more alert to avoid accidents may also be noted. At the Brown & Sharpe works the grinding and polishing departments are supplied with exhaust systems carrying away all the dust produced from the various grinding operations. In other departments where noxious fumes are generated, as in the nickel plating department, similar provision is made.

10. *Education and instruction to prevent accident.* The fact that many accidents occur with new men just starting in shows the importance of careful

supervision and instruction until it is seen that men are reasonably careful in doing their work. Constant watchfulness on the part of the foreman in the cautioning and disciplining of men who are reckless all have their place in the well managed shop. Direct and systematic training along these lines should be given apprentices as part of their instruction.

These ten headings do not exhaust the list which might be considered, but I believe that if each shop were inspected, taking these items one at a time and consistently make provision against accidents such as would be required by a stringent factory law, dealing with guarding, that it would result in a very large reduction of accidents. I emphasize the word *consistently* because I feel that there are few shops but what if all provisions for safeguarding were as good as the best they now have there would be a vast improvement. I also emphasize the taking of these items up one at a time in making an inspection because it is easy to miss one when looking for another; for example, it is easy to overlook projecting set screws on revolving parts when looking for exposed gears. The most thorough treatment is by a classified and specific investigation followed by periodical inspection to see that provisions adopted are continued in force.

THE NEW POSTAL SAVINGS BANKS

Before the branch postal savings bank opens in your town, you will want to know the following facts. So, cut this out and keep it. It may help you to become a saver.

Thus far the new postal savings banks, authorized at the last session of Congress, are merely experiments. Since the first of January forty-eight have been in operation—one in each State and Territory—and, for purposes of observation, they have been operating in small towns. On July 1 it is planned to establish these banks in thousands of towns and cities, and a new and general form of saving will come into being in this country. Meanwhile, it may be useful to outline, briefly, the regulations governing these branch banks and their depositors:

1. Deposits are limited to $500.

2. Interest is paid at the rate of 2 per cent, but money must be left on deposit one year before any interest is paid—then interest becomes due at the end of each month. Compound interest is not allowed.

3. One dollar will start an account, but postal savings cards and postal savings stamps may be bought for ten cents each, and when nine stamps are pasted on one card the card may be turned in and exchanged for a certificate of deposit, a form filled out, and an account started.

4. No book is issued to the depositor —only a certificate, a duplicate of which the postmaster keeps. On the envelope containing the certificate, however, are lines ruled for the convenience of the depositor wishing to keep track of the deposits as they are made.

5. Any one over the age of ten may become a depositor, and shall have sole control over the account; only by appearing in person and turning in certificates to the required amount may a depositor withdraw money.

6. A depositor with $20 in certificates may exchange them for a twenty-year gold bond of the United States, paying 2½ per cent interest. There is no limit on the amount of such exchange. Therefore, it will be a common practise when a depositor's account reaches the $500 limit to invest it in these Government 2½ per cents.

7. Only the totals of the deposits are to be reported to Washington.

8. The postmaster is to deposit the money taken in in a local bank, or the most convenient bank, that qualifies to receive it. (To qualify, the bank must buy United States bonds or other approved bonds and deposit them with the Treasurer of the United States.) Banks pay 2½ per cent interest on such deposits.

9. Only the regular patrons of the postoffice having the branch postal savings bank may become depositors therein.

10. Once an account is opened, additional deposits may be made by mail.

Mutuality

*By W. A. Grieves, Employment Superintendent
The Jeffrey Mfg. Co., Columbus, O.

Co-operation has become the dominant consideration in present day business. Its power is being emphasized in every movement toward social and industrial progress.

Manufacturers realize that only through this medium can their mutual interests as manufacturers be best conserved.

As successful business men, you know the necessity of co-operation, one with the other, in obtaining the results for which you are striving.

You are here today with this one dominating thought: "What can we do that will bring greater harmony, and consequently larger gains to our business?"

Now it has always seemed to me that in this effort toward co-operation, we have been working from effect to cause when we should have been working in the reverse order,—from cause to effect.

In glancing over the report of the last annual meeting of your Association, I noticed a statement in the report of your Commissioner which read: "The past year has been rather uneventful in labor incidents, your officers having devoted more of their time to preventing rather than combating labor difficulties."

That sounds good. It is getting at the nerve of the whole matter. It is fast becoming the spirit of the hour.

We are beginning to see that the differences between employer and employee, are not, after all, so much of a problem. We are thinking of them in terms of a condition, and the effort of your officers to improve that condition, points to a new era of more amicable relationship.

To the thoughtful employer and business man has come a new idea. He is beginning to regard any movement for the betterment of industrial conditions as not only humanitarian, but as good business policy.

Frequently we hear it said that any effort toward industrial betterment has its origin, not in the desire for public good, but in selfishness, and some employers are inclined to regard Labor Efficency Betterment with a degree of suspicion. They have seen some failures, some evidence of ingratitude on the part of employes, and because of this have said there is nothing in it. But with this view we have very little sympathy. Our years of experience in associating and working with men compel us to regard any such conception as wrong.

And this is the line along which progressive and far-sighted employers are thinking and working; and judging from your Commissioner's report of last year it has been effective.

To my way of thinking there is no other solution, and the fact that your Association has honored me by inviting a discussion of the subject of Labor Efficency Betterment among employees, is evidence that the desire is strong on your part to improve their condition.

Labor Efficiency Betterment, as generally conceived, is not a new factor in industrial life. For years many attempts have been made along this line with varying degrees of success. Like every other phase of industrial progress, experiments have had to be made, and in doing so many mistakes have resulted.

**Read at the annual meeting of the Metal Trades Association.*

But these are to be expected in every line of activity having as its aim the improvement of conditions.

The honest and aggressive employer in asking the question: "What elements can I bring into my business that will increase the output, reduce the cost of production, and at the same time raises the wages and earning capacity of my employees?"

In the consideration of these questions many an employer has not observed the fundamental element essential in obtaining the results he is seeking. If the output of his business is to be increased he must employ the best workmen, for the burden or overhead is no greater for a good man than a poor one; and if his shop is run on modern plans, he can reduce the cost of production, at the same time raise the wages and earning efficiency of his men, as well as greatly increase production.

But the problem does not end here. If the employer is to have the most competent and intelligent men in his service he must provide the most inviting environment. Intelligent and thrifty men seek the most intelligent and wholesome places to work.

Now the difficulty in the way of greater progress in the field of industrial betterment seems to lie in the fact of the employer not knowing just how far he can go and at the same time avoid the criticism that he is paternalistic. To strike the middle ground between these extremes is the question. To do so the employer must know his men; and if his business is such that a personal contact with his employees is impossible, he should secure the services of some one qualified by training or natural ability to do it for him.

This condition has led to the creating of a new field in present day industry, namely that of the Social Engineer. I don't know that the title is a good one, but it seems to be the best to designate the calling that has yet been found.

LABOR EFFICIENCY BETTERMENT.

Mutuality, or Labor Efficiency Betterment, if it is to mean anything, must not be of the mushroom variety. All permanent things are of slow growth, and this feature of modern industry can not be made an exception. As in many other lines of moral and physical uplift, the progress of Mutuality has been greatly retarded because of the mistakes of those who, eager in their desire for personal gain, have made it a matter for commercial exploitation.

The average workman is at once suspicious of anything suddenly thrust upon him even though it may be for his well-being.

To be successful, any attempt at Labor Efficiency Betterment must be approached from the standpoint of a thorough understanding on the part of the employer and employee that it is to be for their mutual interests.

I recall very distinctly an incident in my early experience in this work of an ill-fated attempt to hurry a project which was designed to help promote mutuality, but which was turned down by the employees for no other reason than that they did not understand it. The lesson was somewhat dearly learned; but it was far reaching. It taught me that if the work in which I was engaged was to succeed, it must be brought about slowly, step by step, here a little and there a little, until the entire confidence of the men has been secured.

To obtain this some person must have the work constantly in mind, and while it is necessary that the start should come from the employer himself or some one delegated by him, the greatest results will not be found until the employees themselves have been enthused to the degree that they will make suggestions direct.

Get an employee to feel that the responsibility for carrying into effect his own suggestion devolves upon him, and in nine cases out of ten he will work hard to see that it is done.

Allow me to illustrate this point by a specific incident which occurred in our own plant about two years ago. We had a Mutual Aid Association that had been in existence for about 18 years. It had been through all the vicissitudes and trials incident to Associations organized along similar lines. It had done much good, but had not solicited the support of the employees to the degree that was possible under different organization.

It fell to the lot of the writer, to attempt a reorganization. A plan was submitted which, if carried out, we believed would increase the membership at least 200 per cent, these conclusions being reached after a careful study of the situation. The evening upon which the vote was to take place arrived, but it was discovered two or three men who had not been consulted about the plan, and who consequently misunderstood it, were doing all in their power to defeat it. These men were influential among the other fellows to the degree that defeat of the plan was inevitable. Seeing the situation was hopeless, I moved that a committee composed of these men and myself be appointed to reconsider the plan, claiming that nothing could be lost by the delay. After much argument the motion was carried.

The committee met and instead of taking the initiative in the discussion I asked for a suggestion as to how the plan might be improved. The member who had been the principal cause of opposition made a suggestion of change, the adoption of which did not in reality affect the original plan, but the insertion of which seemed to win him wholly for it. He was made chairman of the committee and made the report to the Association at its next meeting. The plan was unanimously carried and inside of one year the membership had increased nearly 300 per cent.

I cite this merely to show that if results are to be obtained the interest of the men must be secured. They must be educated to realize that everything that helps to make more desirable the working conditions, is an advance toward the goal of harmonious relationship and better understanding.

While the company which I represent has always been interested in seeing that good physical conditions existed about the plant, it was only about two years ago that steps were taken for a definite policy of industrial betterment. And in this connection let me say that the work was not conceived through any spirit of sentiment, but rather as a business proposition. Our company has always acted upon the belief that that which is good for the employee must be good for the employer, and this idea has constantly been emphasized to the employee as each phase of our Labor Efficiency Betterment has been developed. That this plan has worked satisfactorily and produced results is not due, we believe, so much to anything we ourselves have done as to the fact that it is right and human.

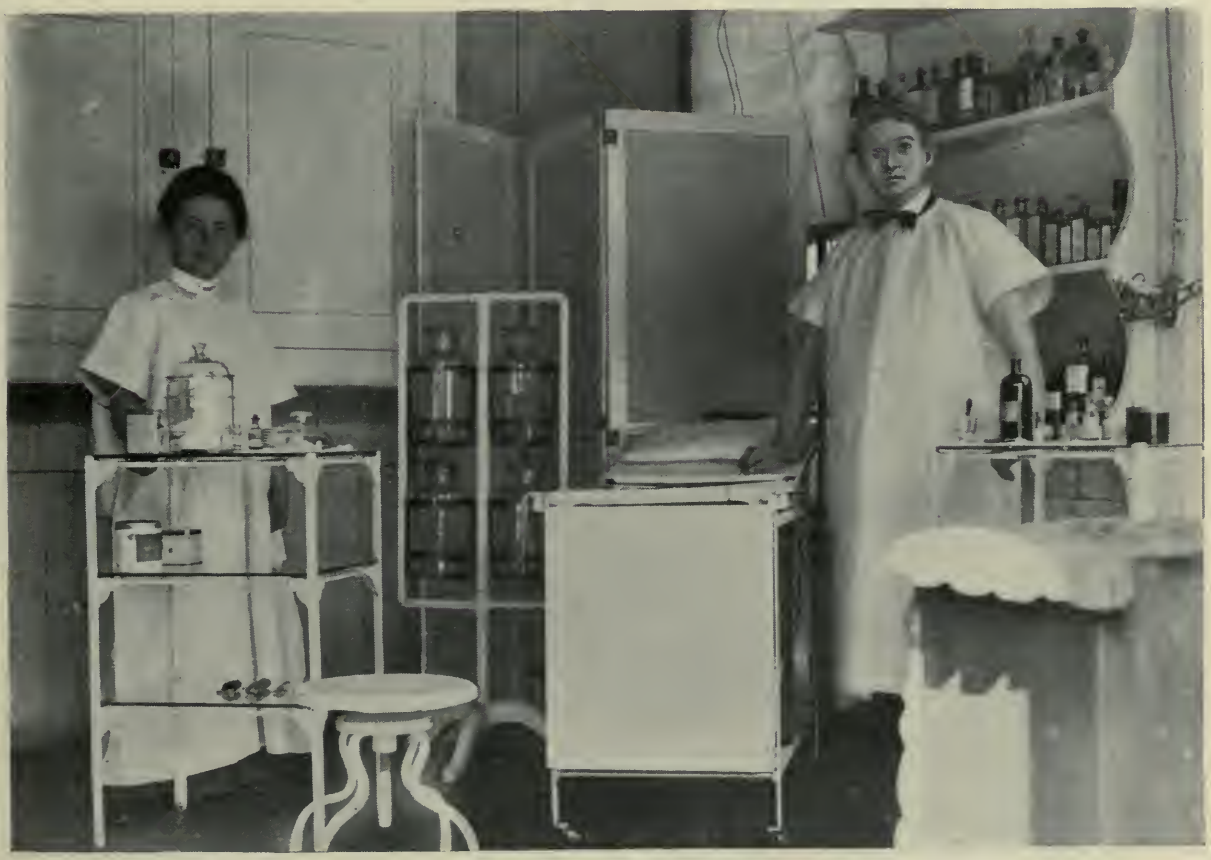
We believe that there is no danger in sympathetic co-operative fellowship of employer, and employee,—a fellowship of purpose and interest, established not upon the plane of paternalism, but upon the plane of justice to both.

The greatest strength and largest hope for the great industrial reforms, which all fair-minded men are seeking, depend upon our finding this meeting ground of common interest and purpose.

Partnership with our workmen and the desire to realize it with all its benefits, is fast becoming the dominant consideration. Gradually we have reached this point, and are finding the call of duty, with regard to the question of protection of health and limb of our workmen, and many kindred questions lengthening



One of the Jeffrey Clubs at Dinner in Employee's Dining Room



Hospital - Doctor and Nurse



One of the Girls' Rest Rooms



One of the Rooms in Men's Club

out straight and clear before us and have found opportunity for accomplishing the needful things waiting at our doors. This is not said from the standpoint of those who have attained, but rather from that of those just beginning to do, and who are finding a sense of satisfaction in working out these problems which have as their supreme aim the workman's right to all that is due him.

Now, as this discussion was to contain practical suggestions I shall briefly enumerate some of the phases of Labor Efficiency Betterment being successfully carried on by our company. After the re-organization of our Mutual Aid Association two years ago, we adopted the plan of strongly urging each new employee upon entering the employ of the company to take membership in the Association. This method of securing members of course has proved tremendously prolific. While membership is not compulsory, the benefits are so attractive that more than 93 per cent of all employees who did not already have all the protection they could afford to carry, have been secured for membership.

This has been an excellent protection for our men, as an employee can secure for the small sum of $1 per month as high as $200 in benefits in one year.

Before making self protection a part of the employees obligation upon entering our employ, the Aid Association was continually calling upon the members for special assessments, and frequently appealing to the company for contributions. Under the new plan we have had each year, after paying all claims, $2000 in the treasury, all at a cost of one-third to two-thirds less than under the old plan.

EMPLOYEE NEEDS PROTECTION.

Our experience shows that as a rule the average employee will not protect himself unless urged to do so; and while some employers contribute as much as 50 per cent of the premium to these associations, it does not act as an inducement for the men to join. Given the proper organization, together with due emphasis upon a man's duty to protect himself, and the responsibility of the success of the organization placed entirely upon the men, you can count upon a reasonably prosperous Association. Men appreciate most that which costs something, whether it be in money or effort in social service.

Next in importance to our system of accident prevention by the constant installation of the latest safety devices, is our plan of caring for our injured men.

About three years ago we made a careful study of the number of men who were off work owing to slight injuries, which in themselves were not serious, but through the lack of proper antiseptic treatment, had become infected. Our records showed that on an average as high as a half dozen men were away from work daily for this reason. As it had always been our policy to pay wages for a portion of the time lost by employees through injuries, this investigation revealed a condition that represented a two-fold loss.

We reasoned that under proper antiseptic treatment these infections could be reduced to a minimum, and not only would we save the amount of the employee's wages, but also the greater loss occasioned by a decreased production.

It was not unusual to find some of our most skilled and highest paid mechanics off work for several days because of infection caused by a slight cut or bruise, and when you count what that may mean in decreased production, not only of the injured man himself, but also the possible hold up of an order all along the line, it is not easy to determine the loss.

From the standpoint of cold business this condition demanded a remedy. We at once set to work and thoroughly equipped an emergency hospital and placed a regularly graduated physician and trained nurse in charge. The doctor's

entire time is given to the hospital work and he is assisted in the mornings with the re-dressing by the nurse. The nurse's time in the afternoon is given up entirely to visiting sick ar injured employees or their families.

Out of some four thousand cuts, bruises, sprains, etc., together with re-dressings to the number of over four thousand last year in our plant, the infections resulting did not average more than four per month.

At the close of this report will be found a summary of the surgical and medical cases taken care of at our hospital for a year ending October 31st, 1910.

These figures might suggest to you that there were an abnormal number of accidents in our shops. Such is not the case, however, as we have been told by inspectors that our plant is among the best in the way of safety devices and ways of accident prevention. We believe there are no more accidents in our shops than may be found in any modern and well-equipped factory employing the same number of men.

You may ask of what direct benefit to us is it to have the doctor treat such ailments as colds, indigestion, headache, cramps, sore throats, boils and all the other ailments noted in the list. We answer for the very same reason that it pays us to prevent infection resulting from injury. For the reason that if a man is valuable to have in our employ, he is more valuable if he is in a good physical condition. If an employee has a headache or cramps, it is more profitable to have him treated at our own plant, relieved of his suffering, and sent back to work within an hour, than it is to have him lose a whole day. Then, too, the work our doctor does in the way of preventing illness among our employees by prescribing when the first symptoms are evident, cannot be over emphasized. Dozens of cases of this kind have been brought to our attention. The men are more and more taking the doctor into their confidence, and he is teaching them, in many ways, how to live better physically.

During the past year our nurse made 989 personal calls in the homes of our employees, all of which were made on account of illness or accident to employees or their families. It would be impossible to enumerate at this time the far-reaching results of a work of this kind. From the mission of helping to soothe the pains of a sick baby or consoling the sorrow of a mother discouraged, to that of the work of a truant officer in finding whether the employee reported ill is really sick or away on a fishing or hunting excursion, the diversity of this nurse's duties may be realized.

VALUE OF A NURSE.

We have so many calls from the homes of our employees on account of illness of the wife and children. It was quite common for some of our most valuable men to be away from work on this account. Now, instead of the men going home, the nurse is sent instead. Nine times out of ten she can be of far more assistance than could the father, and this not only saves the time the men would otherwise lose, but is also a great advantage to the company in having the men at work.

Then, too, the nurse's work among our women employees is valuable. What our doctor is to our men, the nurse is to our women. They have learned to confide in her their troubles, and she is constantly being called upon for advice and service.

Another place where the nurse's services have proven to be of financial value is when an employee is injured and is away from work, she is a medium of good-will and interest. Her assurance that the company will deal fairly and squarely with the injured man, has many times made the ambulance chasers' prospects

look slim, and out in Ohio, where our liability laws are so much one-sided, employers from that state will realize the force of this.

Just at this point in the dictating of this paper, the writer's attention has been called to the absence of an employee who has reported sick for two days. He was one of two men in our employ who could do a certain work better than anyone else. There was a rush order of rather unusual size to be completed on a certain date, subject to penalty. The foreman had some question as to the reality of this man's illness, and the nurse was sent to investigate and do what she might in helping him recover. The result of her visit revealed his absence to be due not to illness but rather to his enthusiasm and interest in a bowling contest that was being pulled off in a certain alley in the neighborhood. He reported for work that afternoon.

And so we might speak of many other ways in which this nurse is a valuable factor in our plant, but time will not permit.

Another example of Labor Efficiency Betterment being a good investment from the standpoint of business, is illustrated in a portion of our electrical department, where some fifty girls are employed. When we first began to employ girls, we did not have a desirable rest room where they might eat their lunch and rest during the noon hour, and although the work was not hard and such that they could make good wages,—above the average for women,—we experienced great difficulty in keeping them. It occurred to us that if an attractive and well-furnished room were provided in which they could spend the noon hour in reading, resting and social intercourse, it might help solve the question of why the girls were so often leaving our employ. We did this and in less than one month a 50 per cent increase in permanency resulted, until now it is only a rare case in which girls can be induced to leave us. In fact so attractive is the environment in which they work, that we constantly have applicants waiting for a vacancy to occur in order that they may have a chance of filling it.

Until about two years ago there was no place in our factory to which the male employees could go to smoke or read during the noon hour. As smoking was prohibited within the factory gates, owing to the damage from fire, employees who wished to smoke were compelled to go into the street, or, in disagreeable weather, to the corner saloon, with all its undesirable surroundings. We reasoned that if a man wanted to go to the saloon it was perhaps his own business; but if one of our employees wanted to smoke he ought not to be driven to the unwholesome atmosphere of the saloon to do it.

NEED OF A CLUB HOUSE.

The writer suggested the need of a club house, and did not have any difficulty in getting a meeting of the employees to talk the matter over. A committee was appointed to take the matter up with the company. The result was they secured an adjoining residence to our plant and fitted it up for such use. A committee of employees was chosen to manage it, the purpose being to give the very best service for the lowest possible cost; and although failure was predicted by many, we have gone right ahead for six months, giving excellent service at a most reasonable cost. Everything to eat is of the home-cooking variety, and for a cost of from 10 to 20 cents a good warm meal, served in the most wholesome surroundings, can be secured. Between 300 and 400 are served each day, and our capacity is being strained to the point where we will soon be compelled to provide larger quarters. The company does not contribute anything to this except to furnish the room and light and heat. All help is paid out of the receipts and we are laying away a few dollars each week for improvement and depreciation of equipment. We installed one of the best phonographs we could buy, together with a variety of

records, ranging from Caruso and Melba, to a few of rag-time sentiment. The latter, we are glad to say, have not met with approval and we find there is greater demand for the very best selections of vocal and instrumental music by the great artists.

It is interesting to see how the men will wait and listen to the strains of uplifting music until the last minute before the whistle blows; and we cannot help feeling that they return to their machines with much better mind and heart attitude than if they had spent that time in the contaminating surroundings of the neighborhood saloon.

Acting on the theory that a community is the most prosperous whose working people have the most and best home life, and that the most and best home life conduces to the highest wages, the best education and training and the greatest prosperity of a community, we have recently started a movement toward the establishing of a Building and Loan and Savings Association among the employees.

We believe that we should assist in every way that we can, without touching the border line of paternalism, to help our employees learn to save their earnings. We are convinced that it is not so much the intense desire to squander, as it is perhaps the lack of an immediate opportunity to save, that men do not save more. Saving money is largely a matter of realizing its importance, and if we can help foster any agency that will encourage this sentiment among our employees, we believe it is our duty to do so.

While it is too early to prophesy to what extent an institution of this nature can be made successful, yet judging from the interest and enthusiasm manifested on the part of employees, the outlook is most encouraging. We believe the plan can be made a potent factor in not only helping the employee save his earnings through which he may get a home of his own, but that it will be most profitable to the company in establishing a more permanent constituency of desirable employee.

Now I have enumerated some phases of Labor Efficiency Betterment which have seemed to us sufficently important to take up as a permanent feature of our business. As we said at the beginning of this discussion, we have done so step by step, believing that it is good business and never once allowing our employees to have any other impression. That we have been reasonably successful is not due to the fact that we have attempted anything unusual or extraordinary. We have taken up those things which it seemed to us could be made better, and in a quiet and unassuming manner have succeeded in getting results.

Now the question is asked: "After all, does it pay?" Our own experience answers emphatically in the affirmative. Mutuality is far-reaching. It includes something more than merely business success, for it affects the moral and material welfare of any community. We may rightly emphasize the good business of any such policy; but after all there is an element of sentiment interwoven through all the industrial fabric, the absence of which would be seriously felt. A business policy that absolutely ignores all feeling of sentiment is not desirable. There are contributory causes for business success, and they are fostered by a system of management which recognizes in every one of us a closer tie than that which can be measured by any pecuniary relationship. The dollar does purchase perfunctory service, but it cannot and never will secure of itself loyalty and good will.

MEDICAL SUMMARY.

Summary of surgical and medical cases taken care of at the factory hospital of the Jeffrey Manufacturing Company, Columbus, Ohio, for the year ending October 31, 1910:

Surgical:	
Original Cases	4,266
Redressings	4,291
Infection	47
Medicinal:	
Coryza (colds, la grippe, etc.)	620
Indigestion	418
Headache	370
Cramps (of stomach, dysmenorrhœa, etc.)	305
Sore Throat (Tonsilitis, Pharyngitis)	251
Inflamed Eyes (Conjunctivitis, etc.)	143
Constipation	123
Toothache	90
Diarrhœa	87
Boils	62
Rheumatism	54
Special Advice	36
Diseases of Skin (Eczema, Ivy Poisoning)	29
Neuralgia	25
Nausea	20
Biliousness	19
Hoarseness	16
Lumbago	15
Bronchitis	12
Congested Kidney	12
Hemorrhoids	8
Earache	8
Ill Effect from Heat	6
Nervousness	6
Heartburn	6
Backache	6
Felon	5
Congested Liver	4
Asthma	3
Jaundice	3
Carbuncle	3
Dizziness	3
Hives	3
Ulcerated Teeth	3
Pleurisy	2
Heart Trouble	2
Epilepsy	2
Sick Headache	2
Nasal Catarrh	2
Measles	2
Nose Bleed	2
Cystitis	2
Total	11,394
Average number of employees	2,600

It Doesn't Pay

It doesn't pay to be a grouch,
 It doesn't pay to wear a frown;
Nobody ever made his pile
 By knocking everyone in town.
There are some better reasons why
 A man should smile upon his way,
But here is one: Financially
 A gloomy visage doesn't pay.

There's money in a cheerful smile,
 A fortune in a cheerful word,
And money often reaches souls
 That finer things will leave unstirred.
And so I put it up to you,
 Don't mope and whine along your way;
If it is money you desire,
 A gloomy visage doesn't pay.

'Twere better that you smile, because
 You wish to cheer your fellow-man,
And speak the cheerful word, to help
 A weaker brother if you can.
But if these reasons don't appeal
 To you, I write it down today,
There's money in a happy face;
 A gloomy visage doesn't pay.

—Edgar A. Guest

Detroit Free Press

Sanitary, Safe and Comfortable Working Conditions

*By George W. Brown, Vice President of United Shoe Machinery Co., Boston.

The United Shoe Machinery Company has never undertaken to develop a "model community" nor has it sought to regulate the activities of its operatives outside the factory; but the Company believes in co-operation, and joins hands with the people in its employ in any movement which will promote the general welfare. The personal interests of the 5,000 employees at the North Beverly factory, situated near the city of Beverly, Mass., twenty miles north of Boston, are given the widest range. Thrift is encouraged. Wholesome pleasure is fostered.

The conditions under which the work is done in the shops are a matter of pride with the men themselves. For such of the operatives as desire, special steam trains and special electric cars are provided to carry them to and from the factory. Consideration for the women and girls employed there is shown in the matter of hours. State statistics show that machinists at Beverly receive wages which average among the highest paid in the Commonwealth. The workman is dealt with in such a manner that the importance of individual intelligence and industry is emphasized. The wage question has been made the subject of exhaustive study, and a piece price system has been worked out so that the majority of the operatives work upon that basis. The workman is thus able to regulate for himself his status; he stands or falls according as he pursues his labors.

In the construction of the twelve buildings embraced in the Beverly group especial attention was devoted toward providing the maximum of light and pure air for operatives in every portion of each building. Ninety per cent of the wall space is devoted to windows. A system of fans purifies the air constantly throughout the interior, the same fans distributing heat during the winter. To those who desire it the Company gives the use of kitchen gardens 50 feet square, and a large area of land is thus used to produce vegetables for family use. The Company plows, fertilizes and harrows the soil, and secures the seed; the workmen cultivate the crops. Each spring shrubs and plants are distributed by the corporation for cultivation at the homes of the people. As a matter of convenience there is maintained at the factory a news stand, a laundry agency and a confectionery and tobacco counter. Hundreds of bicycles and motor cycles are provided spacious quarters.

SANITARY MEASURES.

The toilet rooms are conveniently located on each floor of the four wing buildings connecting the two manufacturing buildings. These rooms are located approximately 200 feet apart along the length of the building, and each has ample facilities for serving 250 employees. The rooms are well ventilated, the equipment modern, and the utilities are supplied with local ventilation, each having an area of twelve square inches, to which an exhaust fan is connected at the top of the

*Read at the annual meeting of the Metal Trades Association.

building. The toilet rooms are equipped with water closets, urinals, and a janitor's sink, from which hot and cold water for cleaning purposes can be drawn at all times.

In the same wing buildings and across the corridors are located the clothes lockers and wash rooms. Each employee is furnished with an individual locker of the expanded metal type, allowing ventilation through the locker. The wash rooms have mechanical ventilation which is so arranged that the air is changed every six minutes. They are equipped with individual basins, and have a constant supply of fresh water during the period that the men are washing up. This water is passed through a heater at a moderate temperature before using. There are also shower baths which may be used by the workmen at any time except during working hours. These rooms are cared for by janitors, and kept in a cleanly and wholesome condition without the use of disinfectants.

SAFETY DEVICES.

The power for the manufacturing is supplied to each department or section of the manufacturing floors through induction motors, which are controlled by switches easily accessible. The individual motors which drive the heavier type of machine tools are under the control of the operator. The machine tools are well guarded as regards the covering of gears, fly wheels, etc. A special committee has had this work in charge, and has equipped over 500 machine tools with safe-guards, in addition to those usually on the machines when purchased.

We have exhaust systems connecting machines in our grinding and polishing departments, and have not only carried out all the requirements of the Massachusetts state laws, but have applied this system to machines wherever we deemed it would be of advantage, and are bringing out some grinding machines for our own use with individual exhaust and dust receptacle. Our grinding machines are being equipped with an adjustable iron guard of box pattern design, which covers the wheel entirely with the exception of the small portion actually necessary to be exposed. This is in connection with the individual exhaust system just mentioned.

All elevators are equipped with safety devices as regards gates, etc., and have regular operators. Employees other than the operator are not permitted to run the elevators under any circumstances. We find that the number of accidents has very materially decreased since these safety devices have been placed on our machines.

FIRST AID TO THE INJURED.

We have a well arranged and thoroughly equipped emergency hospital centrally located in one of the wing buildings, which is open at all times when the factory is in operation. A competent attendant is in charge of this room, and in addition we have arrangements with several surgeons and physicians, so that injured employees receive prompt attention. We render only first aid to the injured; but in addition to this, when necessary, have the patient transferred to the hospital or his home if permissible. We require all employees when injured, however slight the injury may be, to report to the hospital attendant. After he has received treatment, a record is made of the case for future reference. We feel sure that the loss of time to our employees is very much less than it would be were they allowed to take care of minor accidents themselves, or depended upon the kindness of their fellow workmen.

EMPLOYEES' CLUBS.

The Company has provided in the factory for its female employees recreation and rest rooms for their sole use, with separate toilet and wash rooms, lockers and bath rooms. These rooms are in charge of a matron and are open at all times while the factory is in operation.

There is a Relief Association, limited in membership to employees of the Company. The officers are elected by ballot from the membership. The dues and benefits are graded according to the weekly earnings of the members. The present membership totals something over 50 per cent of the number of employees in the factory, and the Association has paid to its members in benefits during the past five years nearly $33,000.

The employees have also availed themselves of the savings bank insurance law, and are now carrying something over $220,000 in this line of insurance.

They have formed an Athletic Association, which has recently been presented a club house by the Company, and the use of ten acres for sports. There is connected with this Association a gun club, which has a clubhouse of its own, with traps for trap shooting, rifle range, and short range for revolver practice. There is also a cricket club, with a very fine crease, soccer football club, baseball club, boat club and a tennis club.

The Association clubhouse referred to is fully equipped. In the basement are separate locker rooms, toilets and showers for men and women, and six bowling alleys. On the main floor are lounging rooms, writing rooms, a library, billiard room with four tables, a card room, and a cloak room. The second story is devoted to a hall with stage for theatricals, having a seating capacity of 450. The building is lighted throughout with electricity and gas. The dues are merely nominal and carry all the privileges of the clubhouse and organization.

There is a Musical Club that each year presents an opera or other form of entertainment for the benefit of the Relief Association. And there is a well organized brass band which gives public concerts during the season.

SCHOOL FOR MACHINISTS.

In connection with the city of Beverly, the Company maintains an Industrial School in which the boys are taught the machinists' trade. A separate department in the factory has been organized for the purpose, and is equipped with all necessary machine tools. The prospectus of this School reads:

> Independent management but having access to the facilities of the high school laboratories, and the factory of the United Shoe Machinery Company.
>
> Enrollment, seventy young men in two divisions, A and B, one week alternately at the school and at the factory.
>
> School days, eight hours. Saturday, holiday. No home lessons. Factory hours and discipline same as for employes.
>
> Machinist-instructor teaches his division in both factory and school. Part time specialists teach science, business practice and civics.
>
> Machinery manufactured is inspected by regular factory inspector, and if satisfactory goes into the regular stock of the Company. A fixed price is paid each pupil for all his product that passes inspection.

EMPLOYEES' DINING ROOM.

The Company maintains a dining room with a seating capacity of 650. Meals are furnished practically at cost. In connection with the restaurant there is a six-acre farm which supplies fresh vegetables in their season.

An Annuity System for Employees

Proposed by MAGNUS W. ALEXANDER, of the General Electric Company, and Chairman Massachusetts Commission on Old Age Pension, Annuities and Insurance.

The following plan is recommended to the consideration of individual and corporate employers as the basis of a contributory system for old age provision, and a reward for long-time, meritorious service of employees. The proposition can be justified on general as well as on specific grounds.

In general, it must be admitted that the stress of modern industrial life makes the proper care of aged workers a problem of increasing economic and social importance and necessity. Unless, therefore, individual employers take the initiative in working out a suitable solution of the problem, the State will be obliged to deal with this matter when, under political pressure of one kind or another, a pension program may be instituted that may prove burdensome alike to the industries and the industrial workers, and demoralizing to the best character development of the people.

On the other hand, it is clear that a frequent changing of the personnel of employees is expensive and ruinous to economical production. To devise proper means of lengthening the period of service of satisfactory employees, by holding out to them a just reward for long-time, meritorious employment, is, therefore, a matter of good business judgment; a provision of this kind, moreover, will attract into the service of an employer well-intentioned workers, who value the prospect of steady employment and the outlook for a more or less independent old age. Finally the right scheme will stimulate among employees habits of industry and steadiness, and will, therefore, tend to increase the industrial efficiency of employees.

Accordingly, the plan herewith submitted has a two-fold object; it takes cognizance of an existing problem which is bound to claim increased attention as time goes on, by stimulating and assisting employees in providing for their wants in old age; and, secondly, it recognizes and seeks to enhance the value of one of the most important assets in competitive activity,—the personnel of employees.

The altruism of the plan, therefore, is, as it should be, consistent with sound business considerations. The plan itself, to be effective and equitable, ought to be based on the following underlying principles:—

1. The plan must be a contributory arrangement, under which employees, with the aid of the employer, make their own provision for old age, and the employer, in turn, adequately recompenses his employees for long-time satisfactory service, which, in part at least, has contributed to the success of the business. It must be accepted as fundamentally correct that in general, employees receive or ought to receive in wages full value for services rendered, and that any additional payment at the end of a fixed period of years must not be looked upon in the light of deferred wages, but as a reward for long-time service. This bonus, on the other hand, to be just and equitable, cannot be large enough to provide an adequate annunity for aged workers. The latter must make essentially their own provision for old age support through saving, but their endeavor should be facilitated by the employer. Aside from arguments of thrift, self-reliance and in-

dustry in favor of a contributory system, it can also be justly claimed that protection against industrial incapacity in old age is an essential to living, which, like all other necessaries of life, should be provided for principally by the individual himself, with such assistance by the employer or State as circumstances in each case may justify.

2. While, in the end, the plan ought to be compulsory for all employees,—for otherwise suspicion and failure to understand may keep many employees from securing for themselves the benefits of the provision, thereby delaying, if not even making impossible, the attainment of the object sought,—yet, in order to avoid misunderstanding and antagonism, the plan may at first be placed on a voluntary basis. Those, however, who once have accepted the provisions of the plan, should be bound thereby while their employment lasts. A compulsory, and, therefore, universal system, would also facilitate its administration.

3. Neither the right of the employer to dispense at any time with the services of any employee, nor the freedom of movement of the employee, must be interfered with, nor should the employee through either action be deprived of any moneys that rightfully belong to him.

4. The financial interests and rights of the employee must be fully safeguarded, and, on the other hand, no undue financial or moral obligation must be placed upon the employer.

5. The employee must be protected against the possibility of being deprived of his bonus rights under this plan through unjust discharge toward the end of the required service period.

6. The employer should not be called upon to compensate for faithful service during a stipulated time until such service has actually been rendered.

7. The plan should be under co-operative management, with employer and employees alike sharing the responsibilities for the successful carrying out of the undertaking.

Based on these considerations, a plan has been worked out which contains essential features of a new aspect of the problem:—

1. The receipt of an annuity by an employee is dependent on the completion of a stipulated service period,—twenty-five years,—and not upon the attainment of a certain age. In this way young men will be attracted into the service of an employer, and will be stimulated early in life to steadiness and industry.

2. An annuitant is not obliged to leave the service of the employer, but may remain at such compensation as is mutually agreed upon between him and the employer. Skilled men, therefore, may become annuitants at an age when their retention in the service might prove very desirable and profitable, both in view of the quality of labor of such men, based on their long-time experience, and the moral effect of their presence in a large working body.

3. Every annuitant secures for himself a monthly allowance commensurate with the amount which he has accumulated during twenty-five years from savings and bonuses; in other words, the payment of annuities is based on actuarial science, which will tend to make the annuity association solvent at all times.

4. In paying bonuses, the employer differentiates between those who, on account of their larger earnings, may be presumed to be men of skill, and therefore of especial value to the employer, and those who belong to the class of unskilled, and can therefore be replaced with little difficulty.

5. The arbitration provided for in the plan deals with the bonus rights of the employee as affected by a just or unjust discharge, and not with the discharge itself. It penalizes, so to speak, an employer for an unjust discharge of an employee after ten years of service, but does not interfere with his inalienable right to discharge, and therefore does not endanger the discipline of the establishment.

THE PLAN.

(*a*) As soon as an employer shall have established an annuity association, every new employee of more than 21 years of age and with at least six months of continuous service shall become (if the plan is compulsory, or shall be entitled to become, if the plan is voluntary) a member of the annuity association, and shall remain a member during continuity of service or until he becomes an annuitant. Employees with prior service at the time of establishment of an annuity association may elect to become members under conditions hereinafter provided for.

(*b*) The management of the annuity association and the care and investment of its fund shall be vested in a board of five trustees, two of whom shall be chosen by the employer, two by the association, and the fifth, as chairman, by the other four trustees.

(*c*) The trustees shall serve without compensation, but they shall be reimbursed out of the annuity fund for any necessary expenses incurred on account of their services as trustees. They shall have power to make by-laws not inconsistent with the provisions of the plan, and to employ clerical and other assistance, and pay for such services out of the annuity fund. The board of trustees shall have the annuity fund audited semi-annually, and all members notified of their account with the annuity fund at that time.

(*d*) Each trustee shall be elected for two years, and until his successor has been chosen and qualified. On a vacancy occurring in the board, the successor to the person whose place has become vacant shall be chosen for the unexpired term in the same manner as was his predecessor.

(*e*) The employer shall designate one of the trustees as treasurer, and place him under adequate bond, and bear the expense for such bonding.

(*f*) Every member of the annuity association shall contribute 5 per cent. (or such other amount as may be decided upon for each annuity association) from his wages or salary as often as the same becomes due, and he shall continue to contribute such amount for tewenty-five years, or until his employment ceases prior to this time.

(*g*) Whenever a member of the annuity association completes ten years of membership, and therefore of continuous service, the employer shall pay to the individual account of such employee with the annuity fund a sum of $100, if the employee's total contributions to the fund have been $350 or more, and $75 if less than $350. He shall pay an additional sum of $100 for further continuous service of five years, if during this time the employee's total contributions have been $175 or more, and $75 if less than $175; and, similarly, he shall pay a further sum of $150 and $100 respectively for five more years of continuous service; and a final sum of $200 and $150 respectively for a completed continuous service of twenty-five years, according to whether the employee's contributions during each of the last two five-year periods have been $175 or more, or less than $175.

(*h*) A member who has completed twenty-five years of continuous membership in the annuity association shall become an annuitant, and as such shall receive during the remainder of his life an annuity payable monthly, whether or

not he remains in the service of his employer or accepts other employment. The annuity shall be in proportion to the annuitant's account with the association at that time and his age at his next birthday, based on the American mortality table and a 3½ per cent. interest rate.

(*i*) Should an annuitant die before having received in monthly allowances an amount equal to his account with the annuity association at the time of becoming an annuitant, his widow or children or parents shall receive the residue of the annuitant's account in the same monthly instalments as those received by the annuitant; or, if no widow or child or parent survive, the residue shall revert to the annuity association. In the latter case, however, the trustees may defray from this residue such funeral expenses as they may deem necessary.

(*j*) Should a member of the annuity association voluntarily quit his employment, and therefore the association, during the first ten years of membership, or should he be discharged or die during such period, he or his legal heirs shall receive back all moneys contributed by him, with interest at the rate of 3 per cent., compounded semi-annually, and he or his legal heirs shall have no further claim on the annuity association or its funds.

(*k*) Should a member of the annuity association, however, voluntarily quit his employment, and therefore the association, after ten and before the completion of twenty-five years of membership, or should he die during such period, he or his legal heirs shall receive back all moneys contributed by him, together with bonus or bonuses of the employer, the whole at 4 per cent. interest, compounded semi-annually, and he or his legal heirs shall have no further claim on the annuity association or its funds.

(*l*) On the other hand, should a member of the annuity association be discharged by the employer, and therefore from the association, after ten and before the completion of twenty-five years of membership, he shall stand discharged as far as his employment is concerned, but the justification of the discharge shall be judged by a committee of three, one to be chosen by the discharged employee, one by the employer, with the chairman of the board of trustees as the chairman of the committee. If this committee declares the action of the employer to be justified, the discharged employee shall receive such back moneys as if he had voluntarily quit his employment. If, on the other hand, the committee does not justify the action of discharge by the employer, the discharged employee shall receive, in addition to his contributions and the then paid bonus or bonuses of the employer, the whole at 4 per cent. interest, compounded semi-annually, the yet unpaid bonus or bonuses of the employer; and he or his legal heirs shall have no further claim on the annuity association or its funds. The decision of the committee shall be final and conclusive.

(*m*) Any employee with continuous service prior to the establishment of the annuity association, who may be admitted to the association, shall have the privilege of dating back his membership in the association to the time when he would have been entitled to membership had the association existed at that time, or to any date between that time and the actual time of joining the association, upon condition of depositing with the annuity association, a sum equal to 5 per cent. of the total wages or salaries earned by him during the full period of prior membership. If the latter has been in excess of ten years, the employer shall then add the proper bonus or bonuses; but no prior service of more than twenty full years shall be recognized unless with the expressed approval of the employer.

(*n*) The board of trustees shall have power to recommend an increase or decrease of the rate of contribution by members of the association, and shall put

such change of rate into effect whenever the same has been accepted by a majority of the members voting thereon by letter ballot. The board of trustees shall also have power to change the rate of interest to be paid on withdrawals whenever the amount of withdrawals and annuity payments over receipts makes such change necessary.

(*o*) The employer shall deduct from the wages and salaries of the members of the association the stipulated contributions to the annuity fund, and shall promptly forward to the treasurer of the association the moneys thus collected. He shall also promptly pay to the treasurer of the association the bonuses when the same fall due.

(*p*) The annuity association shall have no financial claim on the employer beyond the contributions from the wages and salaries of members of the association already collected and the bonuses already earned.

(*q*) The employer shall have the right to withdraw the annuity and bonus system at any time by giving due notice to the board of trustees one year prior to such withdrawal, and no new member shall be admitted after such notice has been served. The annuity association, however, shall be continued during the year following the serving of notice, for the benefit of members and annuities; and at the end of this time the company shall add to the individual account of every member of more than ten years' membership the pro rata share of the bonus due him at the end of fifteen, twenty or twenty-five years' continuous srvice, respectively. The pro rating shall be based on full years of service only.

(*r*) At the time of the dissolution of the annuity system the annuity fund shall be divided as follows:—

1. The annuity association shall buy in a reputable company an annuity for every annuitant at the rate received by him from the association, and shall return to the annuitants any moneys left from their accounts with the association after deducting the cost of such annuities.

2. All members of the association of more than ten and less than twenty-five years' standing shall receive back all their contributions and the then paid bonuses of the employer, the whole at 4 per cent. interest, compounded semi-annually.

3. All other members shall receive back their contributions with 3 per cent. interest, compounded semi-annually.

4. All moneys then remaining in the annuity fund, after deducting the yet unpaid expenses of the board of trustees, shall be divided among all members and annuitants according to the length of their membership in the annuity association.

(*s*) No assignment of any right in or to the annuity fund by any member or annuitant of the association shall be considered valid.

(*t*) In all matters of dispute relating to the rights of members and annuitants of the association and the employer, the board of trustees shall be considered as having final power, except as provided for in article (*i*), and except where any matter is referred to some other person or persons by unanimous vote of the board of trustees.

In the foregoing, the main features of a system have been presented that must be adapted to each industry and its general wage schedule, and to local conditions. The amounts of contributions by employees and of bonuses by employer, herein specified, are illustrations applicable to industries in which the average employee earns $14 per week the year round.

In other industries these amounts will have to be increased or decreased.

An employee earning $15 per week would contribute 75 cents per week, or $975 in 25 years; and the employer would pay $550 in bonuses. At 3½ per cent. compound interest the former sum would accumulate to $1,550 and the latter to $690, so that the annuitant from his account of $2,240 would receive an annuity of about $12.75 per month at age 50, $14.50 at age 55 and $16.75 at age 60, respectively. Similarly, an employee earning $10 per week would receive as an annuitant about $8.75 per month at age 50, $9.75 at age 55 and $11.50 at age 60, respectively.

An employee earning $20 per week would receive a monthly annuity of approximately $15.50, $17.75 and $20.50, respectively, at age 50, 55 and 60.

On File

If an unkind word appears,
 File the thing away.
If some novelty in jeers,
 File the thing away.

If some clever little bit
 Of a sharp and pointed wit,
Carrying a sting with it—
 File the thing away.

If some bit of gossip come,
 File the thing away.
Scandalously spicy crumb,
 File the thing away.

If suspicion comes to you
 That your neighbor isn't true,
Let me tell you what to do—
 File the thing away.

Do this for a little while,
Then go out and burn the file.

—John Kendrick Bangs

Labor Efficiency Betterment

*By Frank Burgess, Boston Gear Works.

Labor Efficiency Betterment is a subject that eventually leads the manufacturer to give it his careful consideration. Modern factory management can not ignore this subject any more than the subject of proper efficiency of tool equipment. Most employees are now influnced in the selection of a position by the facilities afforded them to maintain their health and safety as well as by the ease with which the work can be performed.

As a rule the factory best equipped to maintain reasonable labor betterment is the most liberal in wages to the employees. One of the most important of all betterments is proper light, which enables the workman to perform his labor at less risk of injury, also with less straining of eyesight.

In these days of vernier and micrometer measurements the old days of "1/64 near enough work" has had its burial, and we are using our eyesight to the limit on the average work, except where solid or fixed gauges are used.

The modern shop is the saw-tooth roof with long lights and no shadows cast, no matter in what position the workmen stand.

Ventilation is another important factor in properly maintaining high efficiency. Low studded rooms over damp ground will sooner or later be avoided by high class labor.

Equipment for various purposes will be given brief discription. All workmen should be provided with individual closets and individual wash basins. A neat workman makes a better and more profitable man than one who is allowed to be slovenly in his manners. Equipment should be maintained so that each workman has his own special necessary tools for the machines in his charge. This saves much time in running to tool and supply department, and will soon pay for itself in increased output. By having bells located in the various sections of the shop a boy can be summoned to bring whatever special tools are needed. Better pay a boy for running errands than a high-priced man. Requisition blanks are usually provided on which to write the order for tools and supplies, and usually the foremen of departments sign such orders if of importance.

Safety devices for prevention of bodily injury. The subject of safety devices has recently been given considerable attention by the leading manufactures of this country. We find in looking through our factory that accidents occur where we least expect them. For that reason we have to make special trips of inspection to discover all possible chances for accidents.

In the factory of the Boston Gear Works we have installed a system of daily inspection, and reports upon the condition of the factory from the safety standpoint. We have printed on this report from the main subjects, or causes for accidents, and our superintendent or some assistant makes, at least, a 15 to 30-minute inspection of our factory to check off the conditions as outlined in this inspection report, which report is delivered to our general manager each day.

To take this matter up more in detail:

First: We are particular that passage ways should be kept free from rubbish, idle trucks, ladders and superfluous material of all kinds.

Second: That the shafting, pulleys, clutches, etc., are in proper condition and that all revolving setscrews be covered. We have safety clutches painted red on each line of shafting, and in some cases two or three, which we believe

*Read at the annual meeting of the Metal Trades Association.

are necessary in order to throw off the power in any section where trouble or an injury is likely to occur, where the power transmission must be operated quickly.

Third: That exposed gears be covered with guards. That machines out of repair be thoroughly overhauled and all dangerous parts thoroughly protected.

Fourth: That smoke and dust be removed as far as possible. That oily floors should be cleaned. Matches, lanterns kept in their proper places, and electric wires should be thoroughly inspected from time to time.

Fifth: That workmen should be warned about loose clothing, sleeves, jewelry, etc., catching in machinery, belting, shafting, etc.

Sixth: That cyanides and other dangerous chemicals be marked and given out in special boxes for use with proper instructions.

Seventh: One of the most important things is that of personal carelessness around the machines, shafting, belting, etc. This can only be overcome through the constant instructions through the foremen, and by securing intelligent help.

Eighth: That all dark places, pits, slippery walks and stairs in bad condition be thoroughly taken care of through our Orderly System.

Ninth: That workmen be cautioned not to throw, drop or misplace parts of machines, or other material about the shop.

Tenth: That our engines be thoroughly overhauled and inspected, especially all fly wheels, belts and governors.

Eleventh: That the yard be in perfect condition, as regards nails, sheet iron, rubbish, etc.

After all these things are carefully reported on, we find as stated in our first remarks, that it is often where we least expect an accident that one occurs. While we thoroughly believe that "an ounce of prevention is worth a pound of cure," we find with the utmost inspection that it is possible for some accidents to happen, but that we can reduce these to a minimum by looking ahead, and doing all in our power to help the workman see things in advance, as it is very seldom that they will ever call our attention to them themselves.

Shop Rules. Short shop rules are better than long rules or regulations never read. A few short pithy rules in large print, and easily read, are sometimes handy to refer to, and when aptly applied will save lengthy remarks on the part of the officers in educating the unsophisticated youths, as well as others who forget the principles of success. The following have been adopted as our shop "Rules of Success":

1. Look ahead.
2. Equipment good.
3. Get help or advice when needed.
4. Inspection.
5. Keep parts clean and in their places.
6. "Close deal" anything you start.
7. Report promptly on "unclosed deals."
8. Obedience and respect to superior officers.
9. Be psychological.
10. Success is attained by: ACCURACY—ECONOMY—DESPATCH.

Education. The education of employees should not stop at the time of leaving school or college. In fact, real education has just commenced, and the early training of the scholar is only the beginning of the application of such knowledge when the workman takes the responsibility to share his labor with other workmen to make his position a unit of success for himself and his employer.

The methods adopted are now nearly as varied as are the shops. Many of the smaller shops give this subject but very little attention, and the excuse gen-

erally is that they are too busy with their regular routine work to give it the attention they would like to. In most all instances there is some desire and interest in the matter, but little real action taken, or results obtained. Sometimes classes have been formed, but usually result in failure.

Giving the matter careful thought it has occurred to me that we do not get at the problem with enough system, or method for any real degree of success. One way I might suggest as a help to a real successful issue is as follows: The local organizations of the various large orders, such as the National Metal Trades Association, National Association of Manufacturers, and other kindred associations, should appoint at the expense of the main associations, and shared partly by the locals, a committee to call on the various shops which are not provided with some systematic method of teaching or educating at least the younger employes. This will apply particularly to shops not exceeding 200 employes. Shops larger than this generally have some system of their own provided. This committee is trained in the special educational work, and will lay out a simple but progressive plan that will in a short time far supersede the occasional efforts of an unsuccessful employer of workmen. Frequent visits to each shop not less than once per week will be necessary to accomplish results, until a perfect system is established, and then followed up by correspondence.

There is large room for improvement in this line, and the isolated shops of 50 to 200 workmen are handicapped in not having some real assistance in this line. We look in the future for workmen not only to be good mechanics, but moral, honest, educated, trained and intelligent, and ones who will form the bulwarks of American aggressiveness in all manufacturing industries. Mind and hand must work together to prevent mental stagnation, and increase general health, happiness, and ultimate success.

A HUMAN PRESERVATION INSTITUTE

American Industries in the April issue contains the following editorial note:

Evidences that practical efforts are being made to lessen the great mortality connected with industrial pursuits and to give needed relief to the incapacitated are found in the matured plans of the larger corporations. Among the admirable and praiseworthy attempts to secure results through practical systematized effort should be mentioned the "Human Preservation Institute" recently inaugurated in St. Louis by the Citizens Industrial Association under the direction of its president, Mr. F. C. Schwedtman. Mr. Schwedtman, it will be recalled, is one of the special commissioners sent abroad last summer by the National Association of Manufacturers to investigate accident prevention and industrial relief methods as practiced in Europe, the results of which are now being published in book form by the Association.

The St. Louis institute gives half-hour stereopticon "talks" at noon, and is specially conducted for the business man and the worker. A great number of lantern slides, gathered in Europe, are displayed, and the "talks" really consist of descriptions thrown on the screen with the slide. This method has met with unqualified favor, and the hall is crowded at each exhibition. The subjects include, "The Human Preservation Movement," "Human Engineering," "Accidents in the Industries," "Accidents on the Farm," "Accidents on our City Streets," "Hazardous Trades," "Simple Accident Prevention Devices," "Safety in the Building Trades," "Safety in the Machine Shop," "Safety in the Engine and Boiler Room," "Safety in the Stamping Shop," "Light and Ventilation as Factors in Accident Prevention," and "European Safety Museums."

There is no doubting the great value of such methods of reaching the industrial world, and it is unquestioned that a wide extension of the field will aid greatly in reducing not only the long list of accidents, but also the industrial waste in efficiency and in money. Mr. Schwedtman announces his willingness to assist other communities in equipping similar institutes, and aid can also be secured from the National Association of Manufacturers by addressing the Association's general offices, 30 Church St., New York City. The plan is adapted to the requirements either of large or small cities, or individual factory plants.

Summary of the Report on Conditions of Women and Child Wage Earners in the U. S. in the Cotton Textile Industry

Prepared by VIOLET A. WHITTEMORE.

This investigation was made by the Secretary of Commerce and Labor on the "industrial, social, moral, educational and physical conditions of women and child workers in the U. S. wherever employed with special reference to their age, hours of labor, terms of employment, health, illiteracy, sanitary and other conditions surrounding their occupation and the means employed for the protection of their health, person, and morals," and is one of the most comprehensive and thorough reports ever issued by the Government.

The ages of the younger children, whenever possible, were verified by public records, former schools, bibles, or parents.

In the south practically all the operators in cotton mills are persons native born of native born parents,—while in New England, they are native born of foreign parents, and there are many more who are foreign born.

Physicians, teachers, clergy and others in the locality of the mill were interviewed in regard to the health of operatives, educational opportunities social, moral and other conditions which affected their welfare.

In 1905, the women wage earners in manufacturing industries in the U. S. were 1,065,884.

Of these about one-eighth were cotton workers.

The children wage earners numbered 159,899, one-fourth of whom were cotton workers.

In the south coarse goods are manufactured while in New England fine goods are manufactured.

Weaving engages more women than any other occupation.

Ring spinning comes next.

The decrease of women employed in the factory and the increase of men is apparent all over the country.

In the south more men are employed than women or children but the southern mills have a higher proportion of child laborers than the northern. This may be due to the fact that there is little opportunity for education and other employment or that the place offers little chance for a man properly to support his family without the aid of the younger children.

In the early forties, the mill employees were almost all native born. They were chiefly farmers' daughters. As the demand for labor increased and exceeded this native supply, the mills were obliged to engage foreigners.

This brought about a change for the majority of Americans dropped out. One reason was their objection to work with foreigners; another the emigration to the west.

Today the French Canadians are more numerous in the New England cotton factories than any other race. They are quick to acquire the management of the machinery and are steady workers. Their standard of living being lower than the American they are willing to work for lower wages—therefore are readily employed.

The English who rank next in numbers are engaged in the more skilled occupations. So are the Scotch and Irish, the first of these races to enter the English mills and "their descendants have maintained a superiority in the high grades."

The Portuguese, Poles and Italians are engaged in heavy rough work about the mills.

While the labor force for the New England factories has been recruited largely from the ranks of immigrants and the children of immigrants, the southern mills had to recruit theirs mostly from the native population; this they have done by sending out "Dodgers" who visit the neighboring farmers and describe the great benefits to be derived from cotton mill work.

Oftentimes these "Dodgers" would wait until a circus or show came to town which would attract the farmers; then the "Dodgers" very carefully placed in the farmer's wagons a good supply of

printed matter telling about the factory and stating how much per week a family of a certain size could earn by working in it. The farmers were sure to find them on their return home.

North Carolina, South Carolina, Georgia and Alabama require emigrant agents to be licensed as they are not looked upon with favor by the government.

Child Labor Law.

Maine, Massachusetts, Rhode Island forbid the employment of children in factories under 14 years of age. In New Hampshire children twelve years and over may be employed only when school is not in session.

Some of the southern companies in order to evade the child labor law have what is known as a "helper system." By this system children assist a relative and the latter receives the pay envelope. Sometimes the helpers name appears on the Company's books but more often not.

Some states make the exception to the child labor law in case the child is an orphan, or the mother a widow, or there is a disabled father.

The highest percentage of illiteracy, 48.1 per cent, was found among the children in the cotton mill factories of Virginia.

In North Carolina and South Carolina many mills were found operating at night and in North Carolina a number of women and children were employed.

Wages.

In North Carolina one-fourth of the employees were children. The wage earned in this state was smaller than in any other state of the cotton industry. This is probably due to the coarse weaving which does not require high class labor.

In comparing the earnings of males and females of corresponding ages in all occupations, it is interesting to note that at 11 years, the girls earned 7.7 per cent more than the boys and this advantage was maintained with slight fluctuation until 16 years when the wages earned were the same. The men's wages increased until at 23 years when the women were earning only 72.4 per cent of the earnings of the men of the same age.

Maximum Wages Maintained in Manufacture of Cotton Textiles.

Weavers receive the best wages as they are skilled operatives. The State of Rhode Island pays the highest average of 16.9 cents per hour.

The speeder tenders come next at 16 cents per hour with Rhode Island again in the lead.

In Massachusetts, the ring spinners earn 12.2 cents per hour and the spoolers 11.6 cents.

The doffers 10.8 per hour in Rhode Island.

Scrubbers and sweepers receive highest wages in New Hampshire—10.4 per hour.

One of the reasons why more women than men are employed in the weaving industry is that their fingers are more nimble than men's, therefore better adapted to the work—especially to spinning and spooling.

Fines.

Fines and other deductions from earnings are imposed in most of the mills for bad work, absence, leaving without notice, misconduct, damages to property, etc.

These the employers claim necessary to insure work, but the State of Massachusetts passed a law in 1894 that a weaver's wages could only be affected by fines when there was an imperfection in his own work and only when such imperfections are first exhibited and pointed out to the party to be fined and the amount of the fines are agreed upon by both sides. The passage of this bill seems to infer that there must have been some ground for complaint.

In many mills premiums were offered. In some they were given for better quality but in most cases for quantity.

Massachusetts is the only state where the pieceworker is protected by law from attempts on the part of the employer to vary the piece rate without the knowledge of the employee.

Maine requires the payment of wages bi-weekly and no more than 8 days wages can be held back.

Massachusetts requires weekly payments with no more than 6 days wages held back;

New Hampshire, weekly and no more than 8 days wages withheld.

Rhode Island, weekly payments to within 9 days.

Hygienic Conditions of Mills.

The newer mills are built under hygienic principles, the ceilings are higher, the windows larger and more numerous it being now well known that light and fresh air are powerful germicides.

The electric light has supplanted all other illuminations in these factories.

In the manufacture of cotton textiles, heat and humidity are necessary. The cotton passing through the machinery

generates electricity. This makes the cotton brittle and causes it to run poorly —often breaking and giving the operator much trouble. When there is a certain amount of heat and humidity in the air, this does not happen, therefore artificial humidity under these circumstances becomes a necessity and the regulation of this humidity is important not only because of its relation to the process of manufacture but from the standpoint of the operator's health.

Many people employed in the manufacture of cotton textiles are troubled with throat and lung trouble. This is supposed to be due to the too sudden change from the hot humid atmosphere to the drier and sometimes colder one.

The investigators believe the temperature could be controlled by the thermostat of which there are many patterns. The humidity could be registered by wet and dry bulb thermometers. Careful experiments show that the degree of humidity best suited to the manufacture of fine smooth yarn is not unhealthy or even uncomfortable. The danger comes from the unregulated introduction of moisture—therefore it is important that this be properly regulated.

In woolen mills it has been found possible to substitute in place of the moisture an electric neutralizer. It is a new apparatus and if placed before the strand it neutralizes the electricity generated by the machines running over the cotton.

These have been found adaptable to many places in the cotton mill.

Accidents.

The greatest number of accidents occur between 9 to 10 in the morning; the next largest number betweeen 10 to 11 A. M. and 3 to 4 P. M. The reason for accidents at these early hours is that the operator in beginning gradually to increase his speed while he is gradually becoming fatigued; the result is the accident.

The Mill Community.

This commonly consists of the factory, churches, general store, school, and houses. All these buildings are the property of the mill owners. The dwellings are sometimes tenements but more often small houses. It is the custom that each dwelling supply the factory with so many workers according to the number of rooms.

Sometimes the owners go to considerable trouble and expense to lay out and erect the buildings. They have physicians, architects, and engineers first study the different locations from the health and economic point of view. Then the houses are constructed with electric lights, running water and good plumbing. Trees and grass are planted outside and often parks included.

To encourage the beautifying of yards some of the companies distribute flower seeds and award prizes.

Sometimes the company conducts welfare work, provides athletic grounds, a skating rink, a library, club, Y. M. C. A. trained nurse, etc.

But only large companies can afford to build such communities, carry on this welfare work. Where the mills are smaller there is often an opportunity for owner and operator to become better acquainted and consequently mutual understanding and sympathy are very much in evidence.

It is said the development of the cotton industry is marked by an evolution in the housing conditions.

These housing accommodations among the cotton mill operatives when compared with other laborers having the same income are found to be about the same, the rents are lower and the sanitary conditions better.

There are many interesting incidents which have been left out of this account. There are others sad and pathetic which describe the poverty and misery of many engaged in this industry. But after all employers are now realizing if they want competent help they must give all and more than the law requires. On the other hand the operator is recognizing that he too must be qualified.

Industrial Education in Cincinnati

*Frank B. Dyer, Superintendent of Schools, Cincinnati, Ohio.

For more than fifty years industrial education in Cincinnati was provided for almost exclusively by the Ohio Mechanics Institute, a liberally endowed and splendidly equipped institution, founded in 1828.

In 1906 Dean Schneider introduced into the Department of Engineering of the University of Cincinnati, a city university supported by taxation, his well-known plan of co-operative education, the students spending week about in school and shop for five years, working summer and winter. A new building is nearly completed for the use of this department and the permanency of the method seems to be established.

In 1907 the Board of Education determined to offer an opportunity for vocational training and began the erection of two large high schools each costing, including equipment, nearly one million dollars. While they are cosmopolitan high schools in which all courses are offered, they provide especially for the industrial education of both sexes. These courses are designed to discover aptitudes and give general manual dexterity in the first two years. Then students are placed in commercial shops and continue their schooling either on the alternate week plan for the next two years, or one-half day a week if the necessity of the individual case requires it. In the first school year the boys give three to four hours of the six-hour day to wood work, and to metal the second year. In June of the second year, after their preference for a special trade has been discussed with their teacher, they are placed with employers who will start them on the wages of third year apprentices. If they do not make good by September, they may return to school and change their course. These schools are not trade schools, but they enable boys (or girls) to discover their aptitudes, and enter a trade intelligently at sixteen, which is the legal age in Ohio. The school then follows them for two years and gives them the practical knowledge while the skill in the trade is given in the real shop.

Of course the school shops run at night and are open to adult workers and also to apprentices. There are 2,400 enrolled at present in the industrial night classes. It was soon found, however, that night work does not attract the apprentice. Concentrated attention to a machine for 10 hours a day leaves little surplus energy to draw on at night. A city offers many attractions more alluring to a young mechanic than a night school. After repeated and urgent advertising in shops, we were able to get less than a hundred apprentices in the iron industry who would settle down to regular night instruction. For example, we got twenty-six pattern makers' apprentices and these soon dwindled to sixteen. They were not to blame. They had not the physical endurance.

Thus we came to see that the apprentice is distinctly a day-time proposition. His education must be given not in addition to his work, but in the place of a part of his work. Some of the progressive manufacturers of our city, realizing this, introduced apprentice schools in their factories, but they found themselves unable single handed to cope successfully with the situation for many reasons. Finally the Board of Education determined to establish a day school for machine shop apprentices. The plan was submitted to Central Labor Council, to a Committee of Manufacturers and to the Board of Education and received the approval of all.

*Read at the annual meeting of the Metal Trades Association.

THE CONTINUATION SCHOOL.

The Continuation School for machine apprentices was opened September 1, 1909. It runs 48 weeks a year, eight hours a day, four and a half days a week besides two half days which are spent by the teachers in visiting the boys in the shops, seeing the conditions under which they work, consulting with the foremen about the needs of the boys, and getting ideas and materials for their guidance in teaching. This is an essential part of their work, for there is no handed-down course of study as yet. It must be worked out as they go along.

The students keep a complete file of their work so that the details of the course lie behind them instead of ahead of them. The course runs through four years and consists of one hour of blue print reading, freehand and mechanical drawing, one hour of practical mathematics, one hour of shop science and theory, and one hour for reading, English, spelling, commercial geography and civics; the last hour takes the form of stereopticon talks, readings from industrial history, biography and geography, and discussions of civic and labor questions.

There are about 200 students, divided into nine groups, according to proficiency. They come one-half day, four hours a week, and are paid their usual wage for attendance by their employer and are docked for absence. The immature boys come on Monday, the most mature on Friday, and graded groups between.

The grading of the students must be somewhat elastic, owing to the difficulty of arranging a program for the individual boy that will best suit the convenience of the manufacturer, and also owing to the great difference in the mental attainments of the boys—some having been in high school, and some not able to repeat the multiplication table or spell the names of the days of the week. This necessitates having two teachers to a group of 20 to 25, one to conduct the general work and the other to give much individual instruction.

The entire cost of the school is about $3,000 per year or about $15 per pupil, based on the average number in attendance.

Teachers.—Strange as it may seem to you, the chief difficulty encountered in the operation of public schools for apprentices is not in securing the interest of employers, the approval of labor organizations, the willingness of boys to come, or the necessary funds from the Board of Education; the chief difficulty is in securing properly qualified teachers—teachers who will command the confidence of foremen and employers by their knowledge of shop conditions, who will secure the interest of boys by their enthusiasm and skill in instruction, and who at the same time meet the demands of school authorities as to scholarship and character. We must steer clear of the charlatan on one hand, and on the other of the school pedant who has his knowledge in watertight compartments. After corresponding with technical schools all over the country and finding no suitable person, I settled to study the shop men of our own city and found a man who had worked nine years in the shops and had left to prepare to be a teacher. His old love for the shop came back to him and he had been for several years teaching apprentices in the shop. He had worked over his whole scholastic outfit in terms of shop practice. He had studied the machines to see the problems they presented in mathematics, science and drawing. Elimination of waste and economy of output was the guiding principle of his investigation and instruction. He trains his own teachers and now has three under way, who are assisting by night or day. The school operates at night for the improvement of adult machinists. On Friday night the class is composed of foremen—36 at present—and their discussions illuminate all phases of shop work.

Method.—The work of the school is closely applied to the work of the shop. It is designed for the intellectual improvement of the boys, and to give them

intelligent interest in what they do in the shop, but there is no machine work in the school. For example, suppose the drill press is under consideration. They first read the catalogue description (catalogues are supplied in sets of 25 by the manufacturers). The technical names of parts are noted. Different machines are compared and their respective merits examined. The scientific principles involved in their operation are described. This leads naturally to a study of the blue print. This is followed by a mechanical drawing of some part of the machine. In the discussion, the mathematical relations receive especial consideration. For instance, the speed of the spindle as determined by the relation of the diameters of the cone pulleys is a problem in complex fractions and the boys for the first time in their lives discover the use of what in the early school days was a senseless puzzle. An hour's lesson on complex fractions follows, using an arithmetic first and then a prepared sheet of exercises applied to the drill press.

These lessons are prepared beforehand with great care by the teachers. A blue print of each lesson with the details to be worked out clearly indicated, is placed in the hands of each pupil, so that there is no waste of time. These when filled out complete are called "dope sheets" by the boys and are filed by each boy in his large envelope. The exercises are arranged in sequence so as to conduct the boys through arithmetic, algebra, geometry and trigonometry, using only those parts that have practical application in the shop with such essential principles as are necessary for an understanding of the shop problem.

The above description will apply fairly closely to three of the four hours work a day. The last hour as indicated before is recreational, inspirational, informational and cultural. A piano is provided, a stereopticon with hundreds of slides, maps and charts, sets of books on civics and industrial biography, etc.

Results.—The employers and foremen say there is no loss in output by the boys being out one-half day a week. They more than make up for the absence by their diligence and zeal when they are at work. When the boys start to school they are as a rule depressed, indifferent, disgruntled. They look upon their employer as an aristocrat, their foreman as a slave-driver, their machine as a treadmill and the world at large as against them. Their faces are frozen in a perpetual grouch. The path to advancement seems long and uncertain. As they feel their mind and body settling in a groove they become rebellious and ready to quit. The school comes as a new interest in their lives. They can scarcely realize at first that anybody cares, but soon they thaw out and a new light shines in their eyes. They see for the first time the purpose of instruction which bored them in school days. They have a motive. They can put their knowledge to use. They become interested and intellectually awakened. Their attitude changes toward their employer, their foreman, their machine, the world. They are no longer mere hands, cubs, operatives. They are becoming masters of an honorable craft. As they are induced to go from one shop to another they have been known to make it a condition that they be permitted to attend the Continuation School.

A New Law.—The Board of Education and others in our city who have seen the effect on the boys of this school persuaded the Ohio Legislature last spring to pass a law authorizing boards of education to establish Continuation Schools and requiring the attendance not to exceed eight hours a week, of all who go to work who are under 16 years of age. The Cincinnati Board has set aside $15,000 to put this law into operation in the year 1911. It is therefore evident that our experience gives us faith in the idea. It seems strange that all oversight of children ceases when they go to work. Strange that the State has not considered it a duty to look after their education at the critical period of their existence. Then, if ever, they need moral guidance and ideals kept steadily

before them. That is the time they feel their deficiencies and need instruction and direction. Then they need to be taught to apply what they know to a practical situation. Then their attitude is determined and they will become drudges and outcasts or will acquire that joy in work which will transform their task into an interesting vocation.

We propose in Cincinnati to open two classes of Continuation Day Schools, one voluntary for those over 16 years old, and one compulsory for those under 16. As I see it we should not wait for trade schools to catch boys and lead them to a vocation. We must catch the boy and the girl when they go to work, letting them get their skill under commercial conditions, but supplementing it as they go along with the guidance and instruction they need in this crisis of their lives.

"CONCERNING COURTESY"

The following expression to its Agents, Conductors and other Representatives indicates the attitude of the Lackawanna Railroad Company on a subject of vital interest to its patrons:—

Imitation is the sincerest form of flattery and this clever composition by Mr. Cottrill has been copied in substance by other large concerns and should be more widely known.

The possession in marked degree of any worthy faculty should always be an incentive to develop that faculty. This Company considers that its Agents, Conductors and other representatives possess above the average, the faculty of being courteous to the public. To those who cultivate and exercise this faculty the Company extends its congratulations and its thanks; to those who do not fully appreciate its importance, careful consideration of the following is suggested:

FIRST: The principle that underlies courteous treatment of others is simply that of doing unto others as you would they should do unto you.

SECOND: In a highly complex and technical business such as that of the Railroad there are many things that you, with your training and daily experience understand with perfect familiarity but which the public do not understand; therefore, do not assume that the public should comprehend them without asking questions, but when inquiry is made of you, give the courtesy of a reply just as full and clear as you can make it, and without any suggestion of superiority born of a greater knowledge.

THIRD: Words are only one means of expression and MANNER is quite as important; therefore remember that a kindly and gracious manner is not only the sign and mark of a self-respecting man but is to your words what oil is to machinery in making them move effectively to their purpose.

FOURTH: True courtesy is no respecter of persons. It remembers that "a man's a man for a' that," and gives the civil word and the helping hand quite as readily to the ill-clad stranger as to an official of the Company.

FIFTH: Courtesy is not only something the public have a right to expect of you but it PAYS.

It pays in the friends it makes you personally and as a representative of the Company.

It pays in minimizing the friction of your life, as well as that between the Company and its patrons.

It pays in raising your standing with the Company.

It pays in the personal satisfaction resulting from having done the right and kindly thing, by your "neighbor."

It is the wish of the management of this Company that all its representatives, whose work brings them into contact with the public, may appreciate and fully measure up to their duty and privilege in this respect.

ACCIDENTS DUE TO SWIFTLY MOVING MACHINES AND THEIR AUTOMATIC RATIONAL PREVENTION.

WILLIAM J. MANNING, M. D., Chief Sanitary Officer, Government Printing Office, Washington, D. C.

The conscientious physician always seeks the removal of the cause of any disease that may come under his treatment when that is possible, rather than the treatment of mere symptoms that tend to recur so long as the cause remains.

We may apply this sound principle with practical results to the prevention of accidents arising from swiftly moving or power-driven machines. If manufacturers or factory owners should have passed in their respective states, a provision or clause in any law as concerns liability between the employer and employee, the respective state insurance commissioners to pass on all details of bond application, based on the following, or a similar method:

The manufacturer, builder, or agent of the machine shall place an indemnity bond with an approved surety company, to the amount of, say 5 or 10 per cent. of the total cost of the machine, which bond is to run during the estimated life or period of usefulness of the mechanism, as shall be agreed on, such bond to be drawn on by the employer or manufacturer after an accident, for the purchase of safety devices, bulwarks, mechanical guards, etc., to be placed on the specific machine so covered.

This method should insure to the builder or agent of the machine:

1. The avoidance of the moral responsibility of maiming employees for life.
2. The saving of large treasure, if state governments should adopt such a measure, that is wasted at the present time and otherwise would continue to be wasted, so far as prevention and a repetition of the accident are concerned.
3. Safety measures that are automatic in their function and operation, both obtained at a minimum of cost.
4. Relief of courts of law from the burden of time and expense in passing on the party at fault—the manufacturer as an employer, or the employee through negligence.
5. Universality and automatism of action and scope, whether the machine is a clattering loom in a New England cotton factory, a fast perfecting printing press in New York City, or a threshing machine on some Western farm.
6. Ingenuity of the mechanician or draftsman brought into play at the erection or construction of the machine, in order that the builder or agent may receive low rates on his bond or insurance for a well-protected machine, as is the case of a house well protected from fire —resulting in a low rate of insurance.
7. The minimum expense involved at the time of the construction of machinery in covering all dangerous points.

To the manufacturer or employer it should insure:

1. Relief from mental anguish, responsibility and worry after an accident.
2. Avoidance of expense and reduced profits on his output as the sequel to an injury.
3. Tranquillity of mind, in that defects or dangerous parts of machines that may and do cost him treasure will receive attention hereafter, as well as increased quantity and quality of output—minus damages—that he has apparently heretofore lost sight of.
4. Very little, if any, increase in the cost of machines to him, owing to growing competition and the low cost to the builder of safeguarding machine when it is under construction.
5. The right to sue builder of machine at any time to recover the sum paid for the mechanism, the law holding the sale or transaction void unless bond has been properly filed in the first instance.

To the employee or mechanic it would insure against:

1. Physical pain and misery.
2. Reduced earning capacity.
3. Death, or invalidism for life.
4. The receipt of possible injuries to limbs for which mere money could not hope to offer adequate compensation.

Two Years of Successful Welfare Work in a Factory Employing One Thousand People

Mrs. Emma S. Brittin, Joseph & Feiss Co., Cleveland.

Modern manufacturers have awakened to the importance of the education of the human elements employed in the manufacturing of their output, and between the newest and most up-to-date plants, is keen competition for the best the present experience offers in the matter of Welfare Work.

Here, let us say, is a factory where a Welfare Department has worked untold benefits, and the eager searcher after knowledge of this kind. enthused with another's success, would transplant this system, root and branch, and install it intact in his own plant. Such a proceeding is fatal, for successful Welfare Work is not a cut-and-dried system that can be transplanted at will from one concern to another, and "installed," but it must be the outcome of the particular and peculiar needs of each individual plant, and its growth must be of a very slow nature, to insure its solidity and stability.

During the first or formative period of industrial betterment, the most important factors to be considered among a large body of employees, are the nationalities they represent, the religions, their home conditions, morals, the average plane of education among them, resources already open to them for recreation, their working conditions and environment.

What appeals to, interests and benefits the high-strung, temperamental Italian, will prove a flat failure in attracting the stolid Swede.

The first tangible step in the development of the department under my supervision, was taken by opening up in the factory, a light, clean, quiet room, made cheerful with window boxes, and equipped with a couch, desk, a few chairs, and a small stock of simple medicines. Cases of illness, unsatisfactory deportment, and lastly, personal grievances, were all referred to this room, until a bond of confidence was established with the employees, who gradually realized that here they would receive sympathy, help, and a ready adjustment of their troubles, when such could be accomplished.

The little room for some time represented only a "Trouble Department," but it was a tremendous factor in establishing personal contact; under lock and key, all complaints, items of interest, requests, services performed of any kind whatsoever, were filed away for further study. Recommendations were made from these records each month, and were often adopted and embodied in the general orders issued by the management, and sets of vital statistics were compiled.

Under the line organization existing in the factory, there was sufficient authority back of this room, to include supervision and disciplinary power over foremen and assistants, and those attached to the direct and indirect payrolls.

With the establishment of absolute confidence between the employees and this department, when it was realized that no ulterior motive lay behind its establishment, but only a desire to help and do right, by employer as well as employed, with that knowledge and feeling thoroughly established and in the ascendant, began the Organization Period of the department.



CLOTHCRAFT SHOP, Joseph & Feiss Co., Cleveland



Coat Shop, Area eight-tenth acre



Men's Lunch Room



Women's Lunch Room



Men's Recreation Room



Women's Recreation Room



Women's Wash Room



Section of Women's Locker Room

Personal interviews with five girls from different departments, resulted in the formation of a sewing club, thirty girls immediately requesting membership. Twenty was all that the room, at that time, would accommodate, and the class started with a considerable waiting list. The girls met once a week in the Welfare Room, where personal instruction was given in the embroidering of worth while articles, and an occasional evening was spent in the playing of games and dancing.

This class afterward formed the nucleus of a Utility Committee, which could be called for consultation on any proposed social activity, such as base ball in the summer, dancing in the winter. They were also valuable elements in all factory activities.

When it was decided to do away with the confusion and disorder attendant on the blowing of the whistle at noon and night, and a fire drill formation was adopted for clearing the factory quickly and in an orderly way at such times, these girls were placed at the head of the lines, their immediate friends behind them, and in this way the floor space occupied by one thousand people was cleared without noise or crowding, in *one minute and fifty seconds.*

A pride in leadership among these girls, gradually fostered a certain standard of deportment in the work rooms, and other parts of the building, and pride is a clean and orderly plant.

Suggestions by the department were often met with counter and better suggestions from the girls themselves, and were immediately put into execution.

With an improvement in deportment, followed naturally an increase in productivity, and discharges of employees for misconduct became very rare.

The formative period was in reality a time spent for the classifying of the human machinery with which to carry on the work of education and betterment, and the establishing and developing of high factory standards.

The only increase of the department during this period, was the employment of more scrub and kitchen women, and the installing of better equipment as aids to cleanliness and neatness, as in better and more scrap and refuse baskets, etc.

The third or expansive period of the department, followed naturally and was of much more rapid growth than the two preceding it. Confidence, interest, and high standards had been established, and requests came from the employees for the organization and maintenance of other interests.

The department was enlarged and improved. Clerical work was performed by a Welfare Clerk, so that more time could be given to expanding the departments activities, but the personal contact was never lessened.

A branch of the Public Library was installed, with books in five languages. Three study courses were started, with supplementary reading, and from the book interest came requests for magazines, and the nucleus of a reading room was started, equipped with long tables, supplied with magazines and papers, and has proved a continuous source of pleasure.

A penny bank was organized, receiving deposits from one cent up, paying interest, and making loans to responsible employees.

A small exchange for work, developed naturally from the exquisite hand work, which the girls brought to the department to show, and which being brought to the attention of people of means, resulted in orders for such work, and brought an income for many a previously idle hour.

To meet the demands for dancing during recreation hours, a factory band of twenty-two pieces was organized and plays one evening a week from five to

seven. A pianist and cornetist, volunteers from among the men, play one day a week at noon hour, while from four to five hundred girls participate in the dancing.

At the end of its second year, this particular Welfare Work has again outgrown its quarters, and is looking to the enlargement of its personnel and equipment.

The growth and development of the department has given to the factory a better class of employees, a better disiplined working force, and higher efficency, improved work, and general factory contentment.

Grievances and misunderstandings are adjusted and eliminated, the fear of injustice is eradicated, the department by its prompt investigation of an employee's story, protecting from the tyranny and favoritism of foremen and forewomen.

This Welfare Department is a system of management, trying to run on safe, sane lines of gradual and natural development, without forcing even its best and broadest plans, and seeking to eliminate absolutely all the hysterical elements and "charity" phases, so often found dominating Welfare Work.

SOME PRINCIPLES UNDERLYING A SUCCESSFUL SUGGESTION SYSTEM.

F. G. HALDY.

The suggestion system as developed by some of our largest and most progressive manufacturers, clearly demonstrates that when properly handled it is profitable to both employer and employed.

The first element essential to the success of a suggestion plan is the co-operation of the employee. To gain this the employer must take the employee into his confidence, and by full explanation make him feel that he will be justly rewarded for any suggestion of value, and that every suggestion will be carefully considered, eliminating all personalities.

In order to insure the last feature every suggestion should pass through the hands of an unbiased person or committee, and a copy of the same, numbered to agree with the original, but lacking the signature of the originator, should be sent to the person or persons best qualified to pass opinion on it. This opinion should be expressed as a written report with recommendations as to acceptance or rejection of the suggestion in question.

In large business firms, as a rule, the suggestions are handled by a committee or bureau organized for this purpose. The committee is in close touch with the management, and can therefore be given the power to act on suggestions. When the written report is received by the committee it is carefully reviewed to make sure that every point has been fully covered, and a copy of the suggestion is returned to the originator with a statement of the reasons for accepting or rejecting the idea. The larger the concern, the less personal contact exists between employes and management, consequently the greater necessity for just and satisfying answer to suggestions that cannot be accepted.

Where accepted suggestions are numerous and in many cases closely related, it is advisable to consider them collectively as well as individually to secure a just distribution in the determination of awards. There will be many suggestions received the value of which cannot be figured in dollars and cents, but which when adopted benefit the concern, and these should be recognized by an estimated valuation and award.

The method of rewarding employees for valuable ideas has a great influence on the character of the suggestions received. This was experienced by a large manufacturing concern in the East during the "try-out period" of their own plan. It was decided to stimulate as many suggestions as possible at the start, and to this end one dollar was paid for every suggestion accepted, and a series of money prizes awarded semi-annually for the best, as well as the greatest, number of accepted suggestions received from any one person. The plan effectually brushed the cob-webs from the minds of many workmen and brought to light many valuable ideas that had been stored away for safe-keeping. It was found, however, that after the first flood of suggestions, the quality gradually diminished, although the quantity grew steadily. Towards the close of the first year it was apparent that in the large majority of cases "the dollar" was uppermost in the mind of the suggestor and "any old idea" was put in the box, in some cases a previously accepted suggestion modified or reworded, to gain the coveted "bone." The committee decided to change the plan for the ensuing year to stimulate a greater effort on the part of the employee to produce original and valuable ideas.

The dollar plan was abandoned and replaced by one in which a definite portion of the savings accruing to the company by the operation of a suggestion during one year, was paid the suggestor. If its value had not diminished or been cancelled by other processes and improvements during that period the originator was to receive further remuneration.

The writer is not informed how the last feature has been worked out by the company in question, though the logical plan apparently would be to continue the payment of a just portion of the savings during the entire period in which they obtain. So much for the financial aspect and here a few words on the ethical side of the problem. It is a well known fact that many persons hoard ideas to their own detriment, because frequently when passed on to the man above they are exploited without proper credit resting where it is due.

A successful suggestion system releases this brake on a workman's intellectual usefulness and stimulates his mental growth which, in itself is more valuable to him and to the community than any material gain which may accrue from his accepted ideas. Moreover, the psychological effect of co-workers thinking about and discussing suggestions will arouse some thought-lazy workman to do likewise. This stimulus broadens the mental attitude of a person towards his work and his relations to the company, thereby promoting that feeling of mutual interest or *esprit de corps* which is so much sought after and so hard to gain, especially in large corporations.

Every suggestion system must take into account and harmonize with the conditions peculiar to its own field of action. A system which has proven successful in one locality or particular line of manufacture will not obtain the same results in another, where conditions are quite different. Although the broad principle underlying suggestion systems is the same, the details in each case must be carefully worked out to meet the requirements of the case in hand. Moreover, it must not be taken for granted that a system which works splendidly today will accomplish the same results a few years later. No matter how carefully it may have been planned and launched, it will not continue a success if allowed to drift, and this will be found the chief weakness in a system that has not produced good results.

In this age of constant change and improvement, an enterprise to continue in success must be kept abreast of the times by intelligent and forceful guidance.

A suggestion system is no exception to the rule, and its potentiality for good is proportional to the amount of conscientious and broad-minded effort that is maintained in its management.

AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE ON WORK ACCIDENTS

The following account of the Annual Meeting of the American Academy of Political and Social Science is reprinted from The Survey.

The fifteenth annual meeting of the American Academy of Political and Social Science, which was held at Philadelphia last week, was given over to the subject of work risks in modern industry, and may rightly be classed among that series of protest meetings called forth in the great cities of the East by the recent fire in New York. The sessions of the academy were not devoted to abstract or academic discussion, but sought to present information and to give a hearing to all shades of opinion in the practical constructive work of modifying laws to provide adequate economic relief for industrial accidents. John Graham Brooks, one of the pioneers in the movement for social insurance in America, expressed his wonder at the revolution in public opinion which in the last twenty years has made this the absorbing topic in such a body as the academy.

Specific discussion of the problem of fire was slight, but the Washington place accident was the influence dominating the opening meeting. Later, when F. A. Holmes, director of the Bureau of Mines, was called away by the destruction of seventy-five miners at Scranton and was able to stop at the meeting of the academy the next day on his way to the still more recent mine accident in Alabama, the reality of industrial accidents and the responsibility of the community for their prevention and relief became still more dominant. While Professor Brooks gave credit to the members of the academy for their new spirit of responsibility, Florence Kelley, fresh from association with those whose lives had been affected by the Washington place fire, rebuked them bitterly. To her this body of prosperous citizens, duly appreciative of the wit of the speakers even in spite of the pall of these three calamities that together swept out at least 300 lives, seemed incongruous and heartless. She contrasted with it the solemn, utterly absorbed, and personal grief of the thousands of working people in whose mass meetings and march of protest through the rain she had recently taken part. To the workers the subject of industrial accidents is not, she said, remote, but vital, and they call such events not accidents but injuries, and lay them to no other cause than greed. Like Rose Schneiderman and Morris Hillquit in New York, she said that if those who do not themselves suffer by such accidents fail to protect the workers, the workers must protect themselves; and the recent election of socialist mayors or aldermen in ten western cities shows that that process is under way.

This stimulation of the sense of responsibility served a useful purpose. But even without it, it was quite apparent that the spirit of the meeting was not academic; that the desire was to accomplish practical results. The only speaker who defended at length the present system of liability in the United States was Walter S. Nichols, editor of the Personal Injury Law Journal, who held that the changes now advocated interfere with personal liberty, and that the way out of the difficulty is in the laborer's insuring himself.

The subjects covered in the two days' conference were prevention—made more effective by an exhibit of safety devices; liability and compensation, and state insurance, the latter broadening into the topic of social insurance in all its aspects.

Charles Nagel, secretary of the Department of Commerce and Labor, who presided over the meeting on prevention, defined legislation as the expression of public opinion, and believed that when the ethical standard of the community is built up to demand legislation for the protection of life, such legislation will follow. This demand on the part of the community has, he held, now come into being.

As the first speaker, Mabel T. Boardman of the executive committee of the American Red Cross spoke of the educational work of that body in the distribution of leaflets giving precautions to workers in dangerous trades, and to all persons exposed to dangers. Of these leaflets 60,000 are distributed on the railways alone. Besides this precautionary work, a new and most important form of preventive work undertaken by the society is the study of the causes of epidemic diseases, begun in connection with the pneumonic plague at Mukden by the Red Cross physician, Dr. Richard T. Strong. Prevention of serious consequences after accident is made possible by the text book of the society and its courses in first aid to the injured.

FOR A MODEL STATE LABOR DEPARTMENT

Prevention by safety devices furnished by a state labor department as at present constituted was described by J. C. Delaney, chief factory inspector of Pennsylvania, and the ideal factory department, which should minimize the number of work accidents, by Crystal Eastman. The first essential for such a department, according to Miss Eastman, was the gathering of statistics of all accidents covering number, industry, time, and day of accident, hours of work per day—all these handled by a statistician whose aim was not the mere collection of figures, but generalization from them in regard to preventive measures. The beginnings of such a system of reporting all accidents was made in Minnesota a year ago, and the last report of the Labor Department of that state shows that instead of the 1,590 accidents recorded in 1908, the real record of a year is 8,671. It also shows the proportion of accidents in various trades. The next essentials are an adequate law and an adequate equipment for its enforcement. In place of a law that provides a small fine only and this imposed as a last resort, as in New York, the penalty should be heavy; and furthermore the labor departments should have such summary power of closing factories with unguarded machinery, after due warning, as the departments of health have of closing insanitary premises. The personnel should be adequate in numbers and at least as well paid as are other state departments, which is not now the case. The final essential to accident prevention, in Miss Eastman's opinion, is a good compensation law.

The chief speakers on the general aspects of liability and compensation were John Mitchell, James Bronson Reynolds, John Hays Hammond, P. Tecumseh Sherman, and Walter George Smith. Edwin W. deLeon and J. A. McDonell discussed the attitude of the casulty companies toward industrial accidents and the movement for better legislation. Henry J. Harris of the Federal Bureau of Labor outlined the European experience, Raynal C. Bolling told of the experience in volutary relief of the United States Steel Corporation, and Louis B. Schram of the plans of the United States Brewers' Association outlined in The Survey of April 8. William B. Dickson and Walter E. Edge pointed out the destructive characteristics of the recent New Jersey law, dwelling especially on the fact that its optional character, involving a contract made at employment, evades the constitutional difficulty, while the removal of the customary defences from liability makes the compensation scheme more advantageous to the employer. James A. Lowell of the Massachusetts Commission, J. Mayhew Wainwright of the New York, P. R. Porter of the Missouri, and Launcelot Packer of the Federal spoke of the work of their commissions. The recent decision of the Court of Appeals that the New York law is unconstitutional was fully discussed. The balance of opinion was for the amendment of the constitution. This opinion was best expressed by Charles P. Neill, federal commissioner of labor, and by Joseph P. Cotton, counsel for the New York Commission. The present system of liability, said Mr. Neill, is based on an English judge-made law, founded not on public opinion, but on the personal idiosyncrasy of the judge, and made a hundred years ago. Decisions of the court—that final arbiter in our difficult American process of law-making—can only be guarded against by amending the constitution so that there can be no question of interpretation. Mr. Cotton did not question the justice of the court's decision. He felt, on the contrary, that legally this was the only decision the court could make. He pointed out that the court still left in force in the state laws for the safeguarding of machinery and also the recent liability law which removed the customary defences. He felt, however, that for the adequate protection of both employee and employer—whose insurance burden was vastly increased by the latter law—an amendment to the constitution was the only recourse. He suggested the following amendment:

"The Legislature may impose such reasonable conditions on any contracts of living or employment as shall be designed to guard or protect the health, or safety, or well being of any of the parties thereto or the public, or to make provision for the payment to employee or dependents for financial loss caused by accident or disabilities in such employment."

All representatives of labor, among whom was James A. Gernon of the Joint Labor Conference of Greater New York, supported this position. The position taken, on the other hand, by William Draper Lewis, dean of the law school of the University of Pennsylvania, and George W. Anderson of Boston was that constitutional amendment is unnecessary. Mr. Lewis contended that as the anti-trust law was designed, to prevent the consumer from being deprived of property in enhanced price without due process of law, so the public in not making up the workman's financial loss in con-

sequence of injury is depriving him of property without due process of law, and he should therefore be protected by law. If this fact and the fact that the workman's is not a free contract had been brought home to the Court of Appeals, he believed that the New York compensation law would still stand. Mr. Anderson contended that, as it stands, the New York law is within the police powers of the state, and cited in this connection the recent Supreme Court case of the Noble State Bank vs. Haskell (Oklahoma), in which a state bank was forced to pay to a state insurance fund under the police power of the state. Judge Holmes delivered the opinion in this case and said, in substance, that the police power can be used "in aid of what is sanctioned by usage or held by the prevailing morality or strong and preponderant opinion, to be greatly and immediately necessary to the public welfare."

DISCUSSION OF STATE INSURANCE

The subject of state insurance against accidents led inevitably into state insurance against invalidity and old age, and, with the exception of F. C. Schwedtman of the National Manufacturers' Association, who outlined accident insurance plans of that body, all the speakers on this subject urged the necessity of adopting the German system in full, with such modifications as were suited to American conditions. Lee K. Frankel, from his close knowledge of the German system, felt that state insurance rates were infinitely more effective than factory inspection in doing away with the dangers of industry, and sickness and incapacity payments were more effective than tenement house departments in doing away with slums. In answer to the charge of paternalism, he replied that if paternalism meant the protection of the lives and health of the workers, then—to adapt the words of Patrick Henry—we should "make the most of it."

Miles M. Dawson believed that the "best system is best adapted to the best country," and that there are fewer constitutional difficulties in the way of compulsory state insurance than of compensation. He believed, furthermore, that compensation plans have the defect of putting too heavy a burden on the small employer and the "cowardly feature" of cutting off the injured man's income after a limited number of years.

Talcott Williams, editor of the Philadelphia Press, believed that civilization should remove risks or if it could not should pay the damage. He believed, too, that the whole community, not merely those who conducted the industries, should bear the expense of this damage, and he believed that it is arbitrary to set off one form of risk for compensation and not include the three—accident, illnes and death—which civilization is as yet unable to eliminate. Both he and John Graham Brooks contended that whatever the community paid out in a system of state insurance would be returned to it in the greater efficiency of healthy young workers.

This plea of efficiency as the result of eliminating the older workers by a pension system, was made by Franklin McVeagh, secretary of the treasury, and F. Spencer Baldwin of Massachusetts, secretary of three commissioners for pensions for state and municipal employes. Mr. Baldwin made the assertion, based on investigation in state departments, that the removal of old and inefficient workers from the civil service would make a pension system a saving instead of an expense. This assertion is borne out by the statistics of the working of the German system collected by Dr. Zacher of Berlin.

A SOUTH AMERICAN EXAMPLE

A writer from Buenos Ayres to the New York Evening Post sends the following highly suggestive and interesting letter which should be stimulating and helpful to everyone interested in civic comfort:

Sir: During the past forty years I have traveled in all parts of the world, civilized and uncivilized, but this is my first visit to the South American continent, and I must confess to surprise as well as mortification as an American, and more especially as a New Yorker, to find how far this truly beautiful and luxurious city of Buenos Ayres is in advance of us in regard to street cleaning and the regulation of an unusually heavy wheeled traffic. With a population exceeding 1,300,000, its streets are maintained in a state of perfection such as we do not approach, and yet in many respects their system appears identical with our own as originally inaugurated by Col. Waring. I notice the same white uniforms, the same pattern of broom, shovel, and scraper, even the same receptacles for rubbish; and yet with us the desired result is not at-

tained, while here it is fully accomplished.

This city possesses no visible advantages over New York such as would render the work an easier task in one than in the other; rather the contrary, I should say; as the proportion of horses used here is much greater, automobiles not yet having come into as general use as with us; and yet here such cleanliness is secured as is unequalled in any other part of the world, so far as my wide experience goes. It must be said that the streets generally are admirably and scientifically paved, either with asphalt or exquisitely laid blocks of wood turned on edge and carefully fitted together, and to this extent the work of the men is undoubtedly facilitated. I, however, attach more importance to the excellent system under which the work is carried on than to any other cause. From one to three sweepers are assigned to each city block, according to the exigencies of the case. These men are registered and distinctly numbered, and always have charge of the same section and are not moved about. So that the moment any one block falls below the high standard exacted the delinquent is known, and punishment, swift and sure, is the consequence.

At every important corner, as with us at Forty-second Street and a few other points, special policemen are stationed who by signs direct and control the traffic and prevent any confusion. Upon most of the main boulevards, some of them more than twice the width of our Fifth Avenue, mounted police are substituted. These boulevards are beautifully kept, planted on each side with healthy trees of a uniform size, and which are always, even in this unusually dry season, supplied with sufficient water. The electric lighting of these avenues is carried on a series of tall ornamental iron posts one hundred feet apart and placed in the middle of the roadway, each with a small paved space around it, which is a great comfort to timid crossers and at the same time serves as a dividing line for vehicles going in opposite directions, and every driver is rigidly compelled to keep to his own side, while the mounted police from time to time by a sign hold up the traffic in one direction to allow crossing to side streets; and these regulations are in force all over the city. In the narrow but busy streets, particularly those through which a tramway may run, carriages are allowed to proceed in only one direction, thus materially lessening the chances of collisions.

In respect to the removal of household waste their system is equally admirable. Late at night or in the very early morning hours closely covered vans pass through each and every street collecting garbage and other refuse matter that the householder may desire to get rid of. Such refuse matter must be put in boxes or baskets, but not deposited in the streets before midnight nor after seven o'clock in the morning, and then must be placed close to the house front so as to interfere as little as may be with pedestrains. The result of all this is a perfect condition of the public streets such as I have never seen surpassed, and makes me blush for my native city of New York. Now they have accomplished nothing here that we cannot do by adopting the same methods if we are prepared to carry them out with similar honesty and efficiency.

I have only a very elementary knowledge as to how municipal reforms are brought about, but would suggest that if a competent commission of two or three practical, sensible men should be sent to this country to study details of the system here prevailing and carry back and put same into operation, New York's millions would rise up and call them blessed. So absolutely clean are the streets that watering may be dispensed with and that expenditure saved. So much for the streets of Buenos Ayres, but when I come to the exquisite keep and beauty of their many parks and public grounds and markets, words fail me, and I can only lament the wide difference between these and Central Park, Madison Square, Washington and Fulton Markets.

J. H. W.

Buenos Ayres, February 1.

WHAT A YOUNG GIRL CAN DO

A very bashful young man was driving with his best girl one cool Sunday. The young lady used all of her arts to make him "spoon," but failed, and, despairing, became silent and preoccupied.

"What's the matter?" asked the young man when the silence became oppressive.

"Nobody loves me," said the young lady, tearfully, "and my hands are cold."

"I'm surprised to hear you say that," said the young man. "God loves you and your mother loves you, and, as for your hands being cold, you can sit on them."—Human Life.

Current Review

AMERICAN MAGAZINE

February—The Old Problem of the Dog and the Engine. Wm. Allen White.

March—Frederick W. Taylor. Scientist in Business Management, Ray Stannard Baker.

The Principles of Scientific Management. Part I, Frederick W. Taylor.

April—The Principles of Scientific Management, Part II, Frederick W. Taylor.

AMERICAN INDUSTRIES

February 11—A Humane Corporation.

April 15—Cross-Lights and Counter Claims, Washington Gladden.

THE CAXTON

February—The New Gospel of Efficiency, E. St. Elmo Lewis.

Modern Business Ideals, D. Herbert Moore.

"The King is the Man Who Can," James B. Kirk.

March—Getting the Right Start, E. St. Elmo Lewis.

THE CENTURY

February—The Havoc of Prudery.

March—The Awakening of the American Business Man.

I. The New Science of Management, Will Irwin.

April—The Awakening of the American Business Man.

II. The Human Side of Scientific Management, Will Irwin.

CURRENT LITERATURE

March—The Pathological Problem of the Employed.

EDITORIAL REVIEW

February—The Business Problems of the Day, George W. Perkins.

ENGINEERING MAGAZINE

February—The Twelve Principles of Efficiency (9th No.). Seventh Principle — Despatching, Harrington Emerson.

March—The Twelve Principles of Efficiency (10th No.). Eighth Principle—Standards and Schedules, Harrington Emerson.

March—Editorial Comment. Science versus "Systems."

The Prevention of Industrial Accidents, John Calder.

March 25—The Discovery of the Individual, Edward T. Devine.

Eight Hours, Josephine Goldmark

Industry and Congestion, H. F. J. Porter.

March 25—Manufacturing and Congestion, P. Tecumseh Sherman.

Congestion a National Ill, John Haynes Holmes.

HARPERS MONTHLY

March—Some Recent Experiments in Human Conservation, Robert W. Bruere.

What to do with the Roof.

HEATING AND VENTILATING

February—The Value of Good Ventilation, Severance Burrage, Ph. D.

Standards of Ventilation, W. A. Evans, M. D.

Purity of Moisture in Indoor Air, Charles R. Horniball.

March—The So-Called Open-Air School, Dr. William E. Watt.

The Proposed Factory Ventilation Law for Wisconsin.

IRON AGE

February 16—The Mechanical Engineer and Prevention of Accidents.

February 23—The Dual Usefulness of the Mill Nurse.

Our Immigrant Workmen.

A Model Compensation Code.

Workingmens Compensation.

March 2—A New Indianapolis Industrial Suburb.

March 9—A Novelty in Apprentice System.

Employment Bureau of Pittsburgh Manufacturers' Association.

Workmen's Insurance in Europe.

March 16—The Cincinnati Foreman's Club.

March 23—Accidents and Safeguards in England.

March 30—The New York Workmen's Compensation Decision.

April 6—Compensation Legislation in New Jersey and Ohio.

Workmen's Accident Compensation a Review of Bills.

LESLIES WEEKLY

March 9—Should We Distrust Our Captains of Industry? Paul D. Cravath.

March 16—Lifting the Working Girl's Burden, George Sheridan.

March 4—How Germany Prevents Accidents.

April 1—To Find the Trouble With Indoor Air.

MODERN METHODS

April 8—Why 150 Girls Were Burned.

Property Rights and Workmen's Compensations.

March—Cooperation, Robert G. Smith.

The Best from Employees, L. H. Kassel.

THE FACTORY

March—Putting a Factory on a Paying Basis, John Coapman.

One Foreman's Plan of Management, Leo J. Cleary.

LITERARY DIGEST

February 11—Match-Makers Saved by the Trust.

February 18—How the Postal Banks are Doing.

February 25—Special Training to Aid "All Around" Ability.

(1. Summary of Industrial Engineering.)

March 4—How Germany Prevents Accidents.

McCLURE

February—Women Laundry Workers in New York, Sue Ainslie Clark and Edith Wyatt.

OUTLOOK

February 4—Nationalism and the Workingman, Theodore Roosevelt.

February 11—A Humane Corporation.

Busines Energy, Herbert G. Stockwell.

April—Employer and Employee, T. J. F. Pagels.

April 15—The Conservation of Labor, George Freedrick Stratton.

PEARSONS MAGAZINE

March—Why Women are Paid Less Than Men, Richard Barry.

REVIEW OF REVIEWS

March—Scientific Management in Business, A. W. Shaw.

SCIENCE

March 3—The Air We Breathe in Buildings, Dr. Luther H. Gulick.

March 31—Discussion and Correspondence on "the Air We Breathe."

THE SURVEY

February 4—Jane Addams' Message to Child Welfare Exhibit Home Work in the Tenements, Elizabeth W. Watson.

February 11—Cloakmakers Begin Work for Sanitation.

February 18—Compulsory Playgrounds, William E. Harmon.

Work Poisons—Report of the Illinois Commission on Occupational Diseases.

Safety Devices for Preventing Injuries to the Eye, David S. Beyer.

February 25—An Exhibit of Human Values, R. C. Sanger.

March 4—Enforcement of Labor Laws, John B. Andrews.

The Mechanical Engineer and Accidents.

The Compensation Commissions, P. Tecumseh Sherman.

March 18—Quick Lunches for Efficiency and Health, Alida Lattimore.

Standardization of Safety, Francis H. Bird.

Illinois Factory Inspection Conference, John C. Kennedy.

March 25—The Discovery of the Individual, Edward T. Devine.

Eight Hours, Josephine Goldmark.

Industry and Congestion, H. J. F. Porter.

Manufacturing and Congestion, P. Tecumseh Sherman.

Congestion a National Ill, John Haynes Holmes.

April 1—A New Profit Sharing Plan, John A. Fitch.

REVIEW OF REVIEWS

March—Scientific Management in Business, A. W. Shaw.

SATURDAY EVENING POST,

March 31—Discussion and Correspondence on "The Air We Breathe."

March—The Fifty Per Cent Waste.

Scientific Management—a Warning, Editor.

SYSTEM

February—The Straight Line to Profit, H. L. Gantt.

When the Office Force Works Hardest, J. L. Woolson.

March—Finding the One Best Way, Edward Mott Woolley.

Sharing Profits with Employees, Leopold Katscher.

April—Putting the "One Best Way" into Practice, Edward Mott Woolley.

SURVEY

February—Accident Prevention and Relief, Editor.

Accident Prevention in Germany, Wm. H. Solman.

TECHNICAL WORLD

February 11—Cloakmakers Begin Work for Sanitation.

March—Finding the One Best Way, Edward Mott Wooley.

Sharing Profits With Employees, Leopold Katscher.

March—Raise Wages and Cut Cost, Bailey Millard.



Preliminary Directory of Firms Who Have Established Methods of Industrial Betterment

Prepared by Prof. E. E. Pratt and Winthrop Talbot, M. D.

In the industrial field the tendency of the age is toward scientific management with the end in view of increasing the quantity and quality of the output through raising the standard of productive power of the individual worker.

Along with this tendency has grown the necessity of establishing a feeling of fellowship and sympathy between the employer and employee. In the growth of our present industrial system this human relationship has partially been lost sight of and only recently have we begun fully to realize the economic value of the worker's physicial and mental well-being.

The result of this awakening has been the establishing means of realizing this new policy in progressive plants all over the country.

Industrial betterment is in reality—like Boston—a state of mind and *not* a method of self advertisement. It has been possible in most cases, but not in all, to distinguish the industrial betterment sheep from the near-sheep or goats.

The following list tries to show various concerns who are carrying out plans of betterment, as for instance:

Associations insuring against sickness and death, Pension Funds, Savings and Loan Funds, Profit Sharing, Medical Care, Instruction in Health, Trade Schools, Schools of Instruction, Lunch Rooms, Rest and Recreation Rooms, Bathing Facilities, etc.

Firms whose names are not included are requested to communicate with the editors.

CANADA

Williams, The Greene & Rome Co. Berlin, Ontario

CALIFORNIA

Broadway Department Store..... Los Angeles
Edison Electric Co.....Los Angeles
Kellar-Thomason Mfg. Co..Los Angeles
Letts Department Store...Los Angeles
Los Angeles Gas & Electric Co..... Los Angeles
Weinstock, Lubin & Co....Sacramento
Hale Bros..... San Francisco
Union Pacific System....San Francisco
San Jose Daily Morning Mercury. San Jose

COLORADO

Daniles, The Fisher Stores Co..Denver
Denver City Tramway Co.....Denver
Lewis, The A. T. & Son Dry Goods Co. Denver
Colorado Fuel & Iron Co.....Pueblo

CONNECTICUT

Coe, The Brass Mfg. Co.....Ansonia
Burritt, A. W. Co.....Bridgeport
Norwalk Mills Co.....Norwalk
Yale & Towne Lock Co.....Stamford
Hartford Carpet Co.....Thompsonville
Wallace, R. & Sons Mfg. Co..... Wallingford

DELAWARE

Bancroft, Joseph & Sons Co..... Wilmington
DuPont, E. I. de Nemours Powder Co..... Wilmington
Lobdell Car Wheel Co.....Wilmington
Persey & Jones Co.....Wilmington

DISTRICT OF COLUMBIA

Washington Railway & Electric Co. Washington
Woodward & Lathrop.....Washington

GEORGIA

Columbus Railroad Co.....Columbus
Eagle & Phenix Mills..... Columbus
Mutual Fertilizer Co.....Savannah

ILLINOIS

Illinois Glass Co.....Alton
American Steel & Wire Co....Chicago
Armour & Co.....Chicago
Atlas Brewing Co.....Chicago
Byllesby, H. M. & Co.....Chicago

Chicago Telephone Co.....Chicago
Crane, R. T. Co.....Chicago
Elgin National Watch Co.....Chicago
Fay-Sholes Co. Chicago
First National Bank of Chicago.Chicago
Field, Marshall & Co.....Chicago
International Harvester Co....Chicago
Metropolitan Trust & Savings Bank
..... Chicago
Montgomery, Ward & Co.....Chicago
Sears, Roebuck & Co.....Chicago
Majestic Coal & Coke Co....DuQuoin
Nelson, N. O. Mfg. Co....Edwardsville
Johnson, O. T. Co.....Galesburg
Whiting Foundry Equipment Co...
..... Harvey
Illinois Steel Co..... Joliet
Deere & Co.....Moline
Moline Wagon Co.....Moline
Cobb & Drew.....Rock Falls

INDIANA

Baker Mfg. Co.....Evansville
Wayne Knitting Mills.....Fort Wayne
Indiana Steel Co.....Gary
Atkins, E. C. & Co.....Indianapolis
Laycock, The T. B. Mfg. Co.....
..... Indianapolis
Dodge Mfg. Co.....Mishawaka
Ball Bros. Glass Mfg. Co.....Muncie
Studebaker Mfg. Co.....South Bend

IOWA

Bettendorf Metal Wheel Co..Davenport
Crossett Timber Co.....Davenport
Green-Wheeler Shoe Co....Fort Dodge
Morrison, McIntosh & Co.....Grinnell
Morrison, The Mfg. Co....Fort Madison

KENTUCKY

Avery, B. F. & Sons.....Louisville
Ballard & Ballard Co.....Louisville

MAINE

Eastman Bros. & Bancroft....Portland
Warren, S. D. & Co..Cumberland Mills

MARYLAND

Hochschild, Kohn & Co.....Baltimore
Maryland Steel Co.....Baltimore
Morris & Co.....Baltimore
Reinle, Salmon Co.....Baltimore
Sonneborn, Henry & Co.....Baltimore
Weems Steamboat Co.....Baltimore

MASSACHUSETTS

United Shoe Machinery Co....Beverley
Simplex Electrical Co.....Boston
Stone & Webster.....Boston
Tucker, Anthony & Co.....Boston
United Shoe Machinery Co.....Boston
Walker & Pratt Mfg. Co.....Boston
Willett, George F. Co.....Boston
Woods, S. A. Machine Co.....Boston
Goodhue, Studley & Emery.....Boston
Houston, James A. Co.....Boston
Ludlow Mfg. Associated.....Boston
Plant, Thomas G. Co.....Boston
Pocasset Worsted Co..... Boston
Pray, John H. & Sons Co.....Boston
Regal Shoe Co.....Boston
Shepard, Norwell Co..... Boston
American Felt Co.....Boston
American Soda Fountain Co....Boston
American Telephone & Telegraph
Co..... Boston
Baker, Walter & Co., Ltd.....Boston
Booth Mills Boston
Boston Consolidated Gas Co....Boston
Boston, The Mfg. Co.....Boston
Boston Woven Hose & Rubber Co..
..... Boston
Brown, Durrell & Co..... Boston
Chandler & Co.....Boston
Davidson Rubber Co.....Boston
Edison Electric Ill. Co.....Boston
Eureka Silk Mfg. Co.....Boston
Filene, William Sons Co.....Boston
Forbes Lithograph Mfg. Co....Boston
Gilchrist, The Co.....Boston
Douglas, W. L. Shoe Co.....Brockton
Houghton, Mifflin & Co....Cambridge
Baker, Walter & Co., Ltd...Dorchester
Glendale Elastic Fabrics Co.....
..... Easthampton
Bourne Mills Fall River
Fitchburg & Leominster St. Railway
Co..... Fitchburg
Goodell-Pratt Co.....Greenfield
Wells Bros. Co..... Greenfield
National Blank Book Co.....Holyoke
Taylor, The Burt Co.....Holyoke
Draper Co..... Hopedale
Sturtevant, B. F. Co.....Hyde Park
Chapman Valve Mfg. Co.....
.....Indian Orchard
Ludlow Manufacturing Associates.
..... Ludlow
Faunce & Spinney Lynn
Little, A. E. & Co.....Lynn
Malden & Melrose Gas Light Co...
..... Malden
Milford Shoe Co.....Milford
Talbot Mills North Billerica
Plymouth Cordage Co.....
.....North Plymouth
Berwick & Smith.....Norwood
Stanley Electric Co.....Pittsfield
Fore River Ship Building Co....Quincy
Hampshire Paper Co.....
.....South Hadley Falls
Waltham Watch Co.....Waltham
General Electric Co.....West Lynn
Royal Worcester Corset Co..Worcester
United tSates Envelope Co..Worcester

MICHIGAN

Acme White Lead & Color Works
..... Detroit
Cadillac Cabinet Co.....Detroit
Detroit Stove Works.....Detroit
Detroit United Railway.....Detroit
Farrand, The Organ Co.....Detroit
Hamilton, Carhart & Co.....Detroit
Michigan, The Stove Co.....Detroit
Parke, Davis & Co.....Detroit

Stearns, Frederick & Co.....Detroit
Wolverine Mfg. Co.....Detroit
Durant-Dort Carriage Co.....Flint
Flint Vehicle Works.....Filnt
Grand Rapids Railway Co.....
.....Grand Rapids
Grand Rapids Refrigerator Co.....
.....Grand Rapids
Wallin Leather Co.....Grand Rapids
Cleveland-Cliffs Iron Co....Ishpeming
American Fork & Hoe Co.....Jackson
Field, The L. H. Co.....Jackson
Withington & Cooley Mfg. Co..Jackson
Alaska, The Refrigerator Co.....
..... Muskegon
Mershon, Schnette, Parker & Co...
..... Saginaw

MINNESOTA

Pillsbury-Washburn Flour Mills Co.
Ltd. Minneapolis
Stone, John M. Cotton Mills.....
..... Starkville

MISSOURI

Peck, George B. Dry Goods Co.....
.....Kansas City
Jones Dry Goods Co.....
.....Kansas City
Wagner Electric Mfg. Co.....St. Louis
Ames Shovel & Tool Co.....St. Louis
Nelson, N. O. Mfg. Co.....St. Louis

MONTANA

United Verde Copper Co.....
.....Jerome, Ariz. and Butte

NEW HAMPSHIRE

Amoskeag Machine Shops....Amoskeag
Page Belting Co.....Concord

NORTH CAROLINA

Tompkins, The D. A. Co.....Charlotte
Proximity Mnfg. Co.....Greenboro

NEW JERSEY

Crocker, Wheeler Co.....Ampere
Tide Water Oil Co.....Bayonne
DeWitt Wire Co.....Belleville
Croft, Howland Sons & Co....Camden
Farr & Bailey Co.....Camden
Hunt, C. Howard Pen Co.....Camden
Keystone Leather Co.....Camden
Standard Bleachery Co.....
.....Carleton Hill
Peters, H. S.....Dover
American Swiss File & Tool Co....
..... Elizabeth
Moore, Samuel L. & Sons, Corporation Elizabeth
Hygienic Chemical Co....Elizabethport
Wood, R. D. & Co.....
....Florence, Millville and Camden
Driver-Harris Wire Co.....Harrison
Keuffel & Esser Co.....Hoboken
New York Switch & Crossing Co..
..... Hoboken
Raudnitz, The Adolph Co.....Hoboken
Colgate & Co.....Jersey City
Gibson Iron Works Co.....Jersey City
Koven, L. O. & Bros.....Jersey City
Riegel Sack Co.....Jersey City
Carter, Howe & Co.....Newark
Celluloid, The Co.....Newark
Ferris, The Bros. Co.....Newark
Gould & Eberhardt.....Newark
National Saw Co.....Newark
Western Electric Instrument Co...
..... Newark
Valentine, The & Bentley Silk Co..
..... Newton
Brighton Mills Passaic
Volger, B. G. Mfg. Co.....Passaic
Ingersoll-Rand Co..... Phillipsburg
Potter, The Printing Press....Plainfield
Ludlum Steel & Spring Co....Pompton
Ayars, The Machine Co.....Salem
Sayre & Fisher Co.....Sayreville
Maddock, John & Sons.....Trenton
Roebling's, John A. Sons Co....Trenton
Trenton, The Potteries Co.....Trenton
Clifton, The Silk Mills.....Union
Westinghouse Lamp Co....Watsessing

NEW YORK

Myers, John G. Co.....Albany
Briarcliff Farms Briarcliff Manor
Abraham & Strauss.....Brooklyn
Brooklyn Daily Eagle.....Brooklyn
Brooklyn Rapid Transit Co...Brooklyn
Chelsea, The Mills.....Brooklyn
Iron Clad Mfg. Co.....Brooklyn
Pilgrim Laundry Brooklyn
William, J. H. & Co.....Brooklyn
Barcalo Mfg. Co.....Buffalo
Buffalo Smelting Co.....Buffalo
Burt, F. N. Co.....Buffalo
Hengerer, William & Co.....Buffalo
Larkin Soap Co.....Buffalo
Pierce Automobile Co.....Buffalo
Shepard, Sidney & Co.....Buffalo
Thomas Motor Co.....Buffalo
Lisk Mfg. Co.....Canandaigua
Roycrofters, The East Aurora
Geneva Optical Co..... Geneva
Standard Optical Co..... Geneva
Remington Typewriter Co.....Ilion
Witherbee Sherman Co.....
.....Mineville, Essex County
Orange County Traction Co..Newburgh
American Can Co.....New York City
American Colortype Co..New York City
American Express Co....New York City
American Light & Traction Co.....
.....New York City
American Locomotive Co.....
.....New York City
American Telephone & Telegraph
Co.....New York City
Bloomingdale Bros.....New York City
Brewster & Co.....New York City
Claflin, The H. B. Co....New York City
Cornell, J. B. & J. M. Co.....
.....New York City
Corning, Edward Co....New York City

Crescent Watch Case Co.....New York City
Eaton, The Cole & Burnham Co....New York City
Fifth Avenue Bank....New York City
Gas Engine & Power Co.....Morris Heights
Hammond Typewriter Co.....New York City
Herring-Hall-Marvin Safe Co.....New York City
Hoe, R. & Co.....New York City
Huyler's Candies.....New York City
Interborough Rapid Transit Co....New York City
Keiser, J. H., Inc.....New York City
Library Bureau.....New York City
Macy, R. H. & Co.....New York City
Manning, Maxwell & Moore.....New York City
Metropolitan Insurance Co.....New York City
Metropolitan Street Railway Co....New York City
Minot, Hooper & Co....New York City
Natural Biscuit Co.....New York City
National Cloak & Suit Co.....New York City
New York City Railway Co.....New York City
New York Edison Co..New York City
New York Life Insurance Co.....New York City
New York Telephone Co.....New York City
New York Transfer Co.....New York City
Old Dominion Steamship Co.....New York City
O'Neil-Adams Co.....New York City
Pope Mfg. Co.....New York City
Scheuer, S. & Sons.....New York City
Seabury, Charles L. Co..New York City
Simpson-Crawford Co..New York City
Smith & Kaufman.....New York City
Standard Oil Co.....New York City
Steinway & Sons.....New York City
Stollwerck Bros.....New York City
United States Express Co.....New York City
Wallach's Laundry.....New York City
Wanamaker, John.....New York City
Waterman, L. E. Co....New York City
Wells, Fargo & Co.....New York City
Western Electric Co....New York City
Western Union Telegraph Co.....New York City
Carter–Crume Co. Ltd...New York City
Niagara Falls Power Co..Niagara Falls
Oneida Community, Ltd..Niagara Falls
Shredded Wheat Co.....Niagara Falls
Simon, Ernest Mfg. Co.....Portchester
Adler, Bros. & Co.....Rochester
Bausch & Lomb Optical Co..Rochester
Duffy, McInnerney Co.....Rochester
Eastman Kodak Co.....Rochester
German–American Button Co.....Rochester
Graham, James S. Machine Co....Rochester
Graves, H. B., Home Furnishing House.....Rochester
Rochester Railway Co.....Rochester
Shautz, M. B.....Rochester
Swiss Laundry.....Rochester
Taylor Bros. Co.....Rochester
Salamanca Trust Co.....Salamanca
Saugerties Mfg. Co.....Saugerties
General Electric Co.....Schenectady
Goulds Mfg. Co.....Seneca Falls
Edwards, The O. M. Co.....Syracuse
Onondaga Pottery Co.....Syracuse
Smith Premier Typewriter Co.....Syracuse
Solvay Process Co.....Syracuse
Stearns, E. C. & Co.....Syracuse
Syracuse Chilled Plow Co.....Syracuse
Waldorf Mfg. Co.....Syracuse
Hart & Crouse Co.....Utica
St. Regis Paper Co.....Watertown
Taggart's Paper Co.....Watertown

OHIO

Aultman, The & Miller Buckeye Co.....Akron
Goodyear, The Tire & Rubber Co..Akron
Cleveland Axle Mfg. Co.....Canton
Cleveland Canton Springs Co.....Canton
American Book Co.....Cincinnati
Bullock Electric Co.....Cincinnati
Cincinnati Milling Machine Co.....Cincinnati
The Lodge and Shipley Machine Tool Co.....Cincinnati
Miller, DuBrul & Peters Mfg. Co....Cincinnati
Procter & Gamble Co.....Cincinnati
United States Playing Card Co....Cincinnati
Acme Machine Co.....Cleveland
American Mill, American Steel & Wire Co.....Cleveland
American, The Washboard Co.....Cleveland
Bailey, The Co.....Cleveland
Bell Telephone Co.....Cleveland
Benton, Hall & Co.....Cleveland
Black, H. & Co.....Cleveland
Brown Hoisting Machine Co.....Cleveland
Chandler & Rudd.....Cleveland
Cleveland Automatic Machine Co.....Cleveland
Cleveland Cliffs Iron Co.....Cleveland
Cleveland Electric Railway Co.....Cleveland
Cleveland Hardware Co.....Cleveland
Cleveland Malleable Iron Co.....

..... Cleveland
Cleveland Provision Co.....Cleveland
Cleveland Punch & Shear Co.....
..... Cleveland
Cleveland Twist Drill Co....Cleveland
Consolidated Works, American Steel & Wire Co.....Cleveland
Crow & Whitmarsh Co.....Cleveland
Eisenmann Co., The Charles.....
..... Cleveland
First National Bank.....Cleveland
Forman–Bassett–Hatch Co.....
..... Cleveland
Frazee Laundry Co.....Cleveland
Glidden Varnish Co.....Cleveland
Halle, The Bros. Co.....Cleveland
Independent Telephone Co...Cleveland
Joseph & Feiss.....Cleveland
Lamson & Sessions.....Cleveland
National Carbon Co.....Cleveland
National Electric Lamp Co.....Cleveland
Osborn Mfg. Co.....Cleveland
Pickands, Mather Co.....Cleveland
Sherwin-Williams Co.....Cleveland
Southworth Co., The W. P...Cleveland
Standard Sewing Machine Co.....
..... Cleveland
Taylor, William, Son & Co...Cleveland
White Sewing Machine Co...Cleveland
Winton Automobile Co.....Cleveland
Jeffreys Mfg. Co.....Columbus
Kilbourne & Jacobs Mfg. Co.....
..... Columbus
Lowe, The Brothers Co.....Dayton
National Cash Register Co.....Dayton
North American Watch Co...Mansfield
Chase, The A. B. Co.....Norwalk
Drew, The Selby Co.....Portsmouth
Bissell, The F. Co.....Toledo
Libbey, The Glass Co.....Toledo
Todd, The William Co....Youngstown
Youngstown, The Sheet & Tube Co.
..... Youngstown

PENNSYLVANIA

Chambersburg, The Engineering Co. Chambersburg
Ingersoll-Sergeant, The Drill Co..
..... Easton
Hershey Chocolate Co.....Hershey
Homestead Steel Works....Homestead
LaMont Chemical Co.....Kane
Hamilton Watch Co.....Lancaster
Midvale Steel Co.....Midvale
New Jersey Zinc Co. of Pennsylvania Palmerton
Allen, S. L. & Co.....Philadelphia
Baldwin Locomotive Works.....
..... Philadelphia
Brill, J. G. Co.....Philadelphia
Burnham, Williams & Co..Philadelphia
Curtis, The Publishing Co..Philadelphia
Devlin, Thomas Mfg. Co...Philadelphia
Disston, Henry & Sons....Philadelphia
East St. Louis & Suburban Railway Co..... Philadelphia
Fels & Co.....Philadelphia
Gimbel Bros..... Philadelphia
Liveright Bros..... Philadelphia
Merritt & Co.....Philadelphia
Smith, Kline & French Co.....
..... Philadelphia
Stetson, John B. Co.....Philadelphia
Strawbridge & Clothier....Philadelphia
Wanamaker, John..... Philadelphia
American Sheet & Tin Plate Co....
..... Pittsburg
Carnegie Steel Co.....Pittsburg
Columbia Chemical Co.....Pittsburg
Equitable Life Assurance Society..
..... Pittsburg
Heinz, The H. J.....Pittsburg
McCreery & Co.....Pittsburg
Monongahela River Consolidated Coal & Coke Co.....Pittsburg
National Tube Co.....Pittsburg
Pittsburg Coal Co.....Pittsburg
Pittsburg Steamship Co.....Pittsburg
Porter, H. K.....Pittsburg
United States Steel Corporation...
..... Pittsburg
Westinghouse Electric & Mfg. Co..
..... Pittsburg
St. Clair, The Coal Co.....Scranton
Scranton Railway Co.....Scranton
Union, The Switch & Signal Co....
..... Swissdale
Apollo Iron & Steel Co....Vandergrift
Westinghouse Air Brake Co.....
..... Wilmerding

RHODE ISLAND

Cranston Worsted Mills.....Bristol
Newport Daily News.....Newport
Lorraine Mfg. Co.....Pawtucket
Peace, The Dale Mfg. Co...Peace Dale
Browne & Sharpe Mfg. Co.....
..... Providence
Eastern Coal Co.....Providence
Gorham, The Co.....Providence
Outlet Dry Goods Co.....Providence
Pocasset Worsted Co.....Providence
Providence Dyeing, Bleaching & Calendering Co..... Providence
Providence Engineering Works....
..... Providence
Rumford Chemical Works..Providence
Shepard, The Co.....Providence

SOUTH CAROLINA

Monaghan Mills..... Greenville
Pelzer Mfg. Co.....Pelzer
Brandon Mills..... Greenville
Victor Manufacturing Co.....Greers
Graniteville Mfg. Co.....Graniteville

TEXAS

Sears, Roebuck & Co.....Dallas
Sherman Mfg. Co.....Sherman

VERMONT

Proctor, The Co.....Proctor
Vermont Marble Co.....Proctor

VIRGINIA

Craddock-Terry Co..... Lynchburg
Lynchburg Cotton Mill.....Lynchburg
Lynchburg Traction & Light Co...
..... Lynchburg
United, The Cigarette Machine Co.
..... Lynchburg

WASHINGTON

Northwest Trust & Safe Deposit Co..... Seattle
Seattle Electric Co.....Seattle

WISCONSIN

Hilker, The Wiechers Mfg. Co..Racine
Hoffmann & Billings Mfg. Co.....
..... Milwaukee
Milwaukee Gas Light Co....Milwaukee
Patton Paint Co.....Milwaukee
Racine Sattley Co.....Racine
Stearns, J. S. Lumber Co.....Odanah
Red Cliff Lumber Co.....Superior

RAILROADS

Atchison, Topeka & Santa Fe R. R.
.....Chicago, Ill.
Boston Elevated Railway Co.....
.....Boston. Mass.
Chicago, Cleveland, Cincinnati & St. Louis Railway Co...Cincinnati, Ohio
Erie Railroad Co.....New York City
Great Northern Railway..St. Paul, Minn.
Illinois Central Railroad Co.....
.....Chicago, Ill.
Lehigh Valley Railroad..Buffalo, N. Y.
New York Central Railroad.....
.....New York City
Cincinnati Traction Co...Cincinnati, O.
Pennsylvania Railroad..Philadelphia, Pa.
Southern Pacific Railway..Chicago. Ill.
Seaboard Air Line Railroad.....
.....Portsmouth & Norfolk, Va.
Washington Railway & Electric Co.
.....Washington, D. C.

Human Engineering

WINTHROP TALBOT, M. D., Editor

A Magazine for Employers published to provide a means of exchanging Experiences on the Human side of Industry and a Forum for the discussion of the Conservation of Human Energy

PUBLISHED QUARTERLY

Subscriptions Should be Sent to Human Engineering, Station B, Cleveland

RATES

One Dollar a Year Twenty-five Cents a Copy

Volume I **Number 3**

CONTENTS

		PAGE
Editorial		102
Santa Fe Efficiency System	H. W. Jacobs	106
World's Labor Statistics		108
Workingmen's Insurance	L. D. Brandeis	109
Conservation of Vision	Ida B. Hiltz	114
Strikes in Buenos Aires		116
Service Department in a Small Business	Jane S. Klink	117
Top-Notcher System for Salesmen	D. C. Lowles	124
Standards of Safety from Fire in Factory Buildings	Peter J. McKeon	125
Employers who Demoralize System		133
Review of U. S. Report on Men's Ready-Made Clothing Industry	L. H. Brittin	134
Occupational Diseases	Alice Hamilton, M.D.	142
Standard Working Hours	Josephine Goldmark	150
Ohio Act Regulating the Loaning of Money		155
Conference on the Loan Shark Evil	A. H. Ham	156
Nat. Feder'n of Remedial Loan Associations		161
Report of the Committee on Small Loans in Massachusetts		163
Cooperative Industrial Training		165
Bulletin of the Board of Sanitary Control in the Cloak, Suit and Skirt Industry		170
Fresh Air as a Speed Boss		173
Report of the Public Policy Committee of the National Electric Light Association		177
New Fire Damp Detector		181
National Conference of Charities and Corrections	Marie V. Smith	182
An Innovation in British Wage Scales		184
Industrial Accidents in the United States		186
Kanegafuchi Spinning Company of Japan		186
Current Review		187

Editorial

The human problem in industry briefly is the enlarged problem of home-life. The corporation is but an organized and highly complex family. The same basic principles govern the successful management of each.

* * * *

Good health is the first step towards efficiency. The sick child is a difficult child. The ailing or weak operative is a source of friction. If we condemn parents who injure and maltreat their offspring, in what esteem can we hold those wasteful employers in whose shops, mills, offices, factories, or mines cleanliness, ventilation, lighting and heating are neglected to the harm of all who are compelled to labor therein?

* * * *

The child is a dependant. So is the wage-worker. The child has not the wisdom which comes from experience and training—and especially from education through responsibility. The employee, like the child, must be guided by instruction from chosen authorities. As it is a wise child who chooses his own father, so it is a wise worker who chooses his own corporation. If the parent is just, the child will be obedient; if the principles of justice dominate directorate, managers, superintendents and foremen first, last and all the time, irritation in the working force is minimized.

* * * *

The individual must always be dominant, for no matter of what type the flock or herd may be, a leader will always be the chief need—the alert stag, the rampant goat, the militant bull, or the noble and sagacious man—every gregarious animal feels the same insistent demand for organization and leadership. Yet successful combination depends upon a co-operation that shall be at once general and intelligent. The family where parents are selfish, cowardly, weak or ignorant will have offspring who are uncontrolled, disorderly, diseased and vicious. Unity and forcefulness depend upon co-operation. It is the old fable of the fragile wand and the stout fagot. In unity is strength. This is the age of concentration, co-ordination and co-operation. Subordination to the service of all is the price of leadership.

* * * *

Just as the fealty of the child is the outgrowth of the devoted wisdom and unity of action of the parents, so the loyalty of the employee is the result of the unselfish intelligence of the employer. Arrogance and intolerance in management beget discontent and slackness in service. Self-reliant submergence of self in the leader inspires confidence and zeal in the follower. The clear thinking idealist who has the poise and force to impress his ideas and ideals upon the minds of others is the natural leader who will dominate any situation which may arise and forces progress upon the most sluggish.

Abounding health, even justice, hearty co-operation, steadfast loyalty—these are the elements of industrial progress. Together they produce efficiency. Individually they serve as tests of real worth. At the bar of public opinion every existing civic force is on trial all the time, but in the maze of conflicting testimony many of us are at a loss to judge fairly. Corporate organization must be contrasted with private enterprise, labor unions are offset by employers' associations. We shall not err greatly when we discover under what leadership health, justice, co-operation and loyalty are held in best esteem. For of these are forged good citizenship, and good citizenship is the open sesame to individual and communal contentment, happiness and prosperity.

The topics which aroused the keenest interest in the annual meetings of the Metal Trades Association and the National Manufacturers' Association were identical. In each case industrial education and compensation for workmen's injuries were discussed freely and intensely and each organization went on record as taking definite progressive action. The National organizations of employers can do more than any other agencies to solve the moot problems of industry—more than state or federal government, more than associations of a semi-private nature and more than labor organizations. It is encouraging, therefore, that these great and influential associations are undertaking constructive programs of real worth and by "constructive" is meant a definite educational campaign destined to awaken general appreciation among those holding positions of industrial responsibility that modern business demands application of scientific methods and that it is unscientific and wasteful to neglect such important matters as hygiene, industrial education, the prevention of accidents and disease, the enforcement of compensation for injuries inherent to industry, and the provision by industry for the superannuated and disabled and the dependent families of the dead.

* * * *

The next logical and imperative step is by mutual agreement between national employers' associations to unite upon a common program of national effectiveness. For instance a conference of the representatives of each national committee on Industrial Education could determine upon certain general recommendations to be adopted by each parent association, thus insuring harmony of action by all. All other topics of vital interest could be dealt with in similar manner. Probably the topic of most vital interest and prime necessity to efficiency of industry is the practical application of the basic principles of hygiene,—principles now more honored in the breach than in the observance, owing to a lack of appreciation of the degree of money cost involved in the waste of human energy. As the refinement of industry demands more intelligence, training, and self-control, the cost of human waste becomes more appreciated and the study of industrial hygiene will

become more imperative. It is safe to predict that all of the national employers' associations will appoint Committees on Hygiene at an early date. The International Congress on Hygiene, to be held in Washington, D. C., in 1912, will do much to arouse the industrial world to this need. The appointment of a Committee upon Ventilation, Lighting and Heating by the National Manufacturers' Association in 1910 was a progressive action of broad significance and worthy of emulation by other national bodies.

The Salary Loan problem is a source of irritation, oftentimes as needless as it is provoking. The usurious rate of interest often exacted has been dealt with of late in Massachusetts by a bill which became a law on June 21st and in Ohio by enactment at the close of the last legislature.

The Massachusetts bill provides inadequate salary for a man on whom a heavy responsibility rests, and who certainly will be subject to many temptations. The advantages of the bill are central control, elimination of the fee system, and the allowance of a reasonable rate of interest.

A bill creating a commission of inquiry has been introduced into and passed by the New York legislature, although licensed pawnbrokers are exempted from the inquiry, which seems to be unfortunate.

Of intimate interest to employers is the American Association for the Conservation of Vision, the headquarters of which is in the United Engineering Societies Building, 25 West 39th St., New York. It is probable that no single factor is the source of so much waste in any business or industry as poor eyesight. It is the cause of the majority of accidents and suits for damages from injuries; it is the source of countless costly errors in industrial technique. Eye strain may be accounted as responsible for blunders in bookkeeping which may markedly increase cost of administration.

An attempt, therefore, to utilize the resources of science in preventing eye strain and injury to the eyes, and to apply these measures to practical business, demands the co-operation of every wise employer. It is less costly to prevent injuries than to permit them and it is merely the part of self-interest to participate by subscription of funds and contribution of time also to the admirable activities of this beneficent effort for the conservation of human vision.

The report of our delegate to the Conference of Charities and Correction is printed elsewhere. It was a notable convention. We beg to acknowledge, with thanks on behalf of our readers, the privilege accorded us of reprinting articles contributed to the Conference by Mr. Brandeis, Dr. Hamilton, Mr. McKeon, and Miss Josephine Goldmark.

It may be stated that careful studies in cost effect of industrial fatigue are under way, although no results have been published as yet. It should be the business of every large corporation to maintain a department of Human Engineering, as well equipped as a department of Mechanical Engineering. The skilled human machine is far more costly than almost any mechanical apparatus ever devised and deserves quite as much, if not more, care and study.

The physical bases of efficiency—and by these may be understood the processes of respiration, digestion, sleep, and muscular activity—are constant causes of irritation, friction, injury and waste in industry. They have seldom been given even more than passing attention, but should be related by the business management of a concern to the cost of production.

Nevertheless, it is not assuming too much to say that the largest expenses in maintenance in every firm today are due to the neglect of proper ventilation, temperature, humidity, dust control, and illumination. But few industries have made a scientific study of the needs of the human machine.

Certain of the cotton manufacturers have kept records of the time of day in which accidents most frequently occur, with a view to establishing a relation between fatigue and danger from accidents.

A preliminary study has been made this year—the first of its kind—by the National Electric Lamp Association, to relate, if possible, ventilation to production and breakage.

Certain studies have been undertaken in Chicago on the question of industrial fatigue.

But the list of the application of scientific methods to industrial efficiency on the human side is so brief as to arouse the feeling that employers are not alert financially to their own interests in these most essential matters.

SANTA FE EFFICIENCY SYSTEM

H. W. Jacobs, Asst. Sup't Motive Power

The plan for paying a bonus for increased individual effort was introduced on this railway in November of 1904, through a special staff organization, of which Mr. Harrington Emerson was the head, the first work of this nature being commenced in our Topeka shops.

In the latter part of 1906, from the experience we had thus far gained, it was decided by the management that better results would be obtained by placing the bonus work under the direct supervision of our mechanical organization and substitute for the plan introduced by Mr. Emerson the simplified Santa Fe Efficiency Plan, which had been developed by the officers of this company.

Our form 2502, contains our standard rules and regulations, from a study of which I believe can be gained a fairly accurate idea of the details of plan.

The efficiency system, as applied to the locomotive and car departments of the Santa Fe system, is a practical method of rewarding workmen for an increased output. It provides for the payment of a certain percentage of a man's wages as bonus, for performing a definite amount of work in a specified or standard time.

Under the efficiency system the workman receives an established rate per hour for his labor, as in day work shops. This is a quantity dependent upon the time put in and bears no relation to the output or work done. Thus the workman is certain to receive a month's wages for a month's work, regardless of his output.

The efficiency system is a plan for rewarding the workman for doing more work than is usually done for the straight day rate. In detail, it provides for the payment of 20 per cent of the man's wages as a bonus for performing the work in standard time. The so-called "standard time" of an operation is a time established by the company for performing the operation, and is based on the average time taken by a good mechanic for doing the work. Thus it is within the capacity of the average workman to reach the standard time on all operations by concentrating his efforts and reducing wastes to a minimum. The direct result of the bonus reward is stimulation of the workman to greater effort. His wage per hour goes up, his output goes higher, and the cost of production goes down.

The payment of bonus is made on an efficiency basis, that is, the amount of work a man does determines his efficiency. As previously stated, a bonus of 20 per cent of wages is paid for doing work in the standard time, which represents 100 per cent. efficiency. When more time is taken to do the work than allowed by the standard, the efficiency of the workman necessarily decreases, for which a less amount of bonus is paid, the workman receiving only his hourly rate for doing the work. If the work is performed in less than the standard time allowed, more than 20 per cent bonus is paid for the operation, depending on the reduction made in the time. To illustrate:

Actual Hours Taken	Standard Time Allowed	Eff'y of Workmen	Bonus in Dollars	Total Cost to Company	Hourly Rate of Workmen	Hourly Rate Paid Workmen
150	100	66.7%	$ 0.00	$45.00	$0.30	$0.30
100	100	100.0	6.00	36.00	0.30	0.36
75	100	133.0	11.92	34.42	0.30	0.47

It is shown that the workman taking 150 hours for doing an operation which should be done in 100 hours, does not receive a bonus, and the operation costs the company $45. When the time taken for the job is reduced to 75 hours, the workman receives a bonus of $11.92, which increases his rate from 30 to 47 cents an hour, or 57 per cent, and the total cost of the operation to the company is reduced from $45 to $34.42, or 23 per cent, and the work is completed and delivered in 50 per cent less time.

In the organization and application of the efficiency system to shop work it is necessary to provide:

(a) A complete and definite schedule for each operation.

(b) An accurate time allowance for performing each scheduled operation.

The schedules are short descriptions of the work necessary to do every particular operation on locomotive and car work, stating in detail exactly what work is to be done, and the standard time allowed in hours and tenths of hours for doing the work specified by the schedule.

The schedules are made by men who have had mechanical training. The standard time allowance for each schedule is determined after a study of conditions and a systematic record of the time taken to perform the work by different shop mechanics. The standard time thus obtained is a figure which represents the performance of a good mechanic, working intelligently and at a gait that can be maintained day after day. The standard time on the schedule makes no allowance for wastes and inefficiency, so that to do the work in standard time, or less, workmen will have to approach the methods of the good mechanic. The incentive for increased earnings naturally "tones up" the performance of the workman until a satisfactory bonus is earned, so that the standard time of the schedule is not beyond the capacity of any man who is willing to make the effort.

In handling the efficiency system in the shop, the foreman in assigning work makes out a written order which is transferred by a clerk to a regular work order slip, giving a description of the operation; schedule number applying, standard time allowed, the workman's number and the gang or machine number. This work order is given to the workman by a timekeeper, who spends his entire time among the men, taking up the time worked by them and giving out and collecting work orders. The work orders are held by the men until the work is completed. The time taken on the operation is then placed on the order and it is returned to the timekeeper. This gives the necessary information for keeping the bonus time records, distribution to accounts, etc.

The bonus or efficiency system cannot be installed in a shop without some preparation, if the best results are to be obtained. The betterment of shop tools, machinery, and facilities should precede the installation of the efficiency system in order to put the plant in a condition that will not limit any possible effort on the part of the workman to increase his output. This will bear a great influence on the successful operation of the efficiency system, as poor tools and large output do not go together.

Intelligent and well directed supervision is another essential which is even more necessary than in a day work shop. The work must be planned and organized in a manner that will encourage the workman to do his best. Good tools and facilities with high grade supervision will enlist the confidence of the men. With confidence comes co-operation and that is sufficient to insure the success of any plan for handling men.

The advantages of the efficiency system are realized in actual shop practice. The output of the shop is increased, the cost of production is

decreased, the men make more money and are better satisfied with their jobs. The great body of employees are in accord with the efficiency system. Ample proof of this is offered. It is seen in an increasing steadiness in the men and the way they hold onto their jobs, the efficiency of the individual workman is going up steadily, which shows greater interest and co-operation. There are no labor troubles.

In conclusion, it might be well to say that the introduction of the efficiency system into a shop is best accomplished by experienced men. The local organization is not fitted by training or experience to introduce the system, although under experienced direction they can readily organize and handle the shop on the lines laid down.

WORLD LABOR STATISTICS.

Austria—The legal maximum is 11 hours a day, but is exceeded, under permit, by a large number of workpeople, particularly in the textile trades. In mines the predominant hours are 8 to 9 and in factories 9 to 10 and 10 to 11.

Belgium—In the metal industries nearly half the men work from 9 to 10 hours and the great majority of the rest 10 to 11.

Denmark—The predominant daily hours in the various industries are 10 and 9 to 10. The shortest hours are worked by printers, of whom 90 per cent have less than 10 hours and 36 per cent less than 9. Only 9 per cent in all the trades work more than 10 hours.

Finland—Only 15 per cent of all the handicrafts work less than 60 hours per week, 56½ per cent over 72 hours, 18½ per cent over 84 hours, and some work up to 120 hours, or 17 hours a day for seven days. This, however, includes intervals for meals and, perhaps, for rest.

Germany—In Prussian coal mines the usual underground shift, not counting descent and ascent, is 8 hours, but in Upper Silesia it is 9.7 for hewers and rammers and 10.1 for other workmen; for surface workmen the hours range from 9.8 in State mines to 11.9 at Aix-la-Chapelle. On Prussian State railways the predominant hours are 8 to 9 and 9 to 10; more than half the locomotive men and plate layers have less than 9 hours, but 54 per cent of pointsmen and signalmen are on for 10 to 12. In the building trades weekly hours are as follows in the principal cities: Dresden, 52; Munich and several other cities, 60; Berlin, 53½; Leipzig, 53; Bremen, 54; Cologne, Dusseldorf, Elberfeld, and Bremen, 56; elsewhere, chiefly 59 and 60. The predominant hours per day for factory workers are 9 to 10.

Italy—In factories and workshops more than three-fourths of the employees work 10 to 11 hours.

Netherlands—The predominant hours in most industries are 10 to 11 per day.

Switzerland—In factories the predominant hours are 9½ to 10, and on Saturdays 1 hour less.

United States—In the large cities the average week in certain selected occupations ranges from 44 hours in the building trades in New York, Chicago, St. Louis and San Francisco, to 60 hours for laborers in Philadelphia, Cleveland, Pittsburg, and Detroit. For the whole country: Building, 46.3 to 54.5; engineering, 53.4, to 54; textiles, 55.6 to 60.4; clothing, 51.3 to 56.2; paper, 56 and 59; printing, 50.7 to 53; wood, 55 to 58.

The usual age of beginning work in the several countries is as follows: Hungary and Spain, (factories), 10; Russia, Norway, Sweden, Denmark, Netherlands, Belgium, France, Italy (not in factories), Bulgaria, Luxemburg, Portugal, Roumania, and in 11 American States, 12; Germany, 13; Switzerland and Austria (factories, and in 36 American States, 14; South Dakota, 15. A distinction is made in several countries between ordinary occupations and mines; admission to the latter is at a later age. —Consular Reports.

WORKINGMEN'S INSURANCE—THE ROAD TO SOCIAL EFFICIENCY*

By Louis D. Brandeis

Throughout the civilized world a developing sense of social responsibility has compelled the community to support in some manner its needy members whatsoever the cause of their inability to support themselves.

In granting this aid we are passing from sporadic, emotional charity to organized charities, and from mere relief to preventive measures. We have learned that financial dependence among the wage earners is due, in large part, to sickness, accident, invalidity, superannuation or unemployment, or to premature death of the breadwinner of the family. Contingencies like these, referred to in the individual case as a misfortune, are now recognized as ordinary incidents of the lives of the wage-earners. And since our existing industrial system is converting an ever increasing percentage of the population into wage-earners, the need of providing indemnity against financial losses from such ordinary contingencies in the workingman's life has become apparent. So sickness and death benefits, and methods of compensation for accidents have been resorted to. But this partial workingman's insurance has served mainly in making clear the need of a comprehensive system which shall extend protection also to the wage-earner in case of invalidity, superannuation or unemployment, and to the widows and orphans left helpless by the premature death of husband or father. In this movement to establish a comprehensive system of workingman's insurance, Germany, Austria, France and latterly England have already advanced far.

An Essential of Democracy

The United States must follow on the same path; for the conditions which have led to the introduction of workingmen's insurance abroad are universal in their operation. Besides, the form and aims of our Government should lead us to action as well as the sense of social responsibility. American democracy rests upon the basis of the free citizen. We accord to the men, universal suffrage. We urge strenuously upon every voter the duty of exercising this right. We insist that the voter should exercise it in the interest of others as well as of himself. We give thus to the citizen the rights of a free man. We impose upon him a duty that can be entrusted with safety only to free men. Politically the American workingman is free, so far as law can make him so. But is he really free? Can any man be really free who is constantly in danger of becoming dependent for mere subsistence upon somebody and something else than his own exertion and conduct? Men are not free while financially dependent upon the will of other individuals. Financial dependence is consistent with freedom only where claim to support rests upon right and not upon favor.

President Cleveland's epigram that it is the duty of the citizen to support the Government, not of the Government to support the citizens, is only qualifiedly true. Universal suffrage necessarily imposes upon the State the obligation of fitting its governors—the voters, for their task; and freedom of the individual is as much an essential condition of successful democracy as his education. If the Government permits conditions to exist which make large classes of citizens financially dependent the great evil of dependence should at least be minimized by the State's assuming, or causing to be assumed by others in some form, the burden incident to its own shortcomings.

*Read at the Conference of Charities and Corrections, June, 1911

A Part of the Daily Cost of Living

The cost of attaining freedom is usually high; and the cost of providing to the workingman, as an essential of freedom—a comprehensive and adequate system of insurance—will prove to be no exception to this general rule. But, however large the cost, it should be fairly faced and courageously met. For the expense of securing indemnity against the financial losses attending accident, sickness, invalidity, premature death, superannuation, and unemployment, should be recognized as a part of the daily cost of living, like the more immediate demands for rent, for food, and for clothing. So far as it is a necessary charge, it should be met now as a current expense; instead of being allowed to accumulate as a debt with compound interest to plague us hereafter.

Few intelligent property owners omit to insure against fire. Everybody recognizes the fire insurance premium as a current expense. And yet the chance of loss by fire is very slight as compared with the chance of loss of earnings by sickness, accident or premature death. Every intelligent manufacturer makes in some form a regular charge for depreciation of machinery and plant. And yet the depreciation of man through invalidity and superannuation is no less certain, and frequently more severe, than the depreciation of machinery. Every intelligent manufacturer recognizes rent, interest and taxes as a current daily charge which continues, although his plant is shut down or operates at less than full capacity. The manufacturer makes allowances for this in calculating the cost of production as an extra charge to be met from the earnings of active days. But the cost to the employer of carrying an unused plant is not as great relatively as the cost to the employee of carrying himself and family while unemployed. The manufacturer who fails to recognize fire insurance, depreciation, interest and taxes as current charges of the business, treads the path to bankruptcy. And that nation does the like which fails to recognize and provide against the economic, social and political conditions which impose upon the workingman so large a degree of financial dependence.

The High Cost of Adequate Insurance

What sum would be required annually to provide an adequate system of workingmen's insurance cannot be determined from existing data. The cost would obviously vary greatly in different occupations and different communities. An amount equal to ten per cent of current wages would go far towards relieving in many industries the distress now incident to sickness, accident, invalidism, premature death, superannuation and unemployment of the wage earner. But it is certain that the proceeds of even so large a charge as ten per cent of the average daily wage would, under present conditions, afford merely alleviation of and not indemnity for the losses now attendant upon those contingencies in the life of the workingman. The cost of providing complete indemnity would probably reach an amount equal to twenty-five per cent. of the average daily wage. For the premiums requisite to secure indemnity from losses incident to sickness, accident, invalidity, premature death or superannuation would probably aggregate fifteen per cent. of the daily wage; while the average percentage required to indemnify for unemployment due to lack of work would probably rise above ten per cent.

The Huge Present Waste

This huge and apparently prohibitive expense should not, however, deter us from taking action now. It should on the contrary incite us to immediate and vigorous measures. Indeed it has in it elements of great

encouragement. It will disclose how vast the waste incident to present social and industrial conditions is. And when the extent of that waste shall have been determined, and made clear to our people, a long step forward will have been taken on the road to improvement and resulting social economy.

Some idea of the possibilities of improvement in this connection are indicated by the following data:

Prof. Irving Fisher has compared the mortality record of the industrial life insurance companies which provide life insurance to the workingmen in amounts of less than $500, on the weekly premium plan, with the mortality in the ordinary life insurance companies, in which the policies average $1,000 or more. The figures of deaths per year for each 1,000 persons insured are these:

	Industrial Life Insurance Mortality (Metropolitan Life Experience)	Ordinary Life Insurance Mortality (English Experience)
Age 20	10.5	7.3
25	14.1	7.8
35	17.2	9.3
55	35.	21.7

The conditions under which that portion of our population lives and works who are insured in the ordinary life companies are far from ideal, and leave open a great opportunity for reduction of the death rate. But here we have an average death rate among the workingmen at their most productive age—25 to 35 years—which is nearly twice as great as the death rate among those engaged in other occupations. And this high death rate of the workingman is that of the insured workingman not the death rate of those engaged in extra hazardous trades.

Can there be any doubt that if this heavier mortality had to be adequately compensated for by the State, or the industries, and the insurance cost paid from current earnings, its causes would be adequately investigated, and the evil conditions of living and working which produce it would be remedied? Society and industry would find how much cheaper it is to conserve than to destroy.

The Economy of Humanity

How near at hand the remedy for high mortality lies is illustrated by the experience of the model factory village at Bourneville, near Birmingham. While the average death rate for all ages in England and Wales in the years 1902 to 1907 was 15.7, the death rate at Bourneville was 6.3; and yet the occupations of the inhabitants of Bourneville were fairly representative of the whole country. Over 50 per cent of the workers were factory hands; 36 per cent were mechanics, carpenters, bricklayers and others of unclassified occupations, and about 13 per cent clerks and travelers.

Prof. Fisher concludes also that on the average every American is sick thirteen days in the year.

Possibilities of lengthening lives and avoiding sickness and invalidity, like the possibilities of preventing accidents, will be availed of when business as well as humanity demands it.

William Hard quoted Edgar T. Davies, the factory inspector of Illinois, as saying that in the year 1906 one hundred men were killed or crippled for life in the factories of Illinois by the set screw, and that for thirty-five cents in each instance this danger device could have been recast into

a safety device. The set screw stands up from the surface of the rapidly revolving shaft, and as it turns catches dangerously hands and clothes. For thirty-five cents the projecting top of the set screw could be set flush with the rest of the whirling surface of the shaft and then no sleeve could be entangled by it, and no human body could be swung and thrown by it.

The South Metropolitan Gas Company, which established, in connection with its system of compensation for accidents, a system of inquiry into all accidents with a view of their prevention, reduced the number of accidents per thousand in seven years from 69 to 40.

John Calder, of Ilion, New York, tells of the reduction of accidents in an American plant from a yearly average of 200 to 64.

Can there be any doubt that if every accident had to be carefully investigated and adequately compensated for, their number would be reduced to a half or a third?

Unnecessary Unemployment

And undoubtedly the paramount evil in the workingman's life—irregularity of employment—would yield in large measure to like treatment.

The New York Commission in its recent report on unemployment gives data from the Trade Unions showing "that organized workers lose on the average twenty per cent of their possible income through lack of work."

Some irregularity of employment is doubtless inevitable; but in the main irregularity is remediable. It has been overcome with great profit to both employer and employee in important businesses which have recognized the problem as one seriously demanding solution. Society and industry need only the necessary incentive to secure a great reduction to irregularity of employment. In the scientifically managed business irregularity tends to disappear. So far as is irremediable it should be compensated for like the inevitable accident.

The special and industrial engineers will find much of inspiration and encouragement in the achievement of their fellow engineers of the factory mutual fire insurance companies of New England.

The Example of the Factory Mutuals

The huge fire waste in America is a matter of common knowledge. The loss in 1910 was established at $234,000,000; and yet there is one class of property in its nature peculiarly subject to fire risks which was practically immune. Some 2600 factories and their contents, valued together at about $2,220,000,000 and scattered throughout 24 States and the Dominion of Canada suffered in the aggregate fire losses of about one-fortieth of one per cent. of the value insured. The factories so immune were those owned by members of the so-called "factory mutuals" of New England. The cost to those factories for fire insurance and fire prevention in the year 1910 was only 43 cents for each $1,000 of property insured. Half a century before the cost of insurance to the New England factories was $4.37, or ten times as great. The record of the "factory mutuals" of Rhode Island and of some other States is similar.

Now how has this reduction of fire insurance cost been accomplished? It was done by recognizing that the purpose of these so-called fire insurance companies is not to pay losses but to prevent fires. These mutual companies might more appropriately have been called Fire Prevention Companies, for the losses paid represent merely instances of failures in their main purpose. In these corporations the important officials are not the

financiers but the engineers; men who rank among the leaders in the engineering profession of America. And aiding them is a most efficient corps of inspectors.

The achievement of these factory mutuals—the elimination of 90% of the fire risks—is the result of 60 years of unremitting effort in ascertaining and removing causes of fires, and incidentally educating factory owners and their employees in the importance of providing against these causes. The premiums paid represent the cost of this advice, inspection and education as much as the cost of what is ordinarily termed insurance.

The progress of the factory mutuals in reducing fire losses was relatively slow; but it has been steady, as is shown in the following table of net cost of fire insurance per $1,000 per year in two representative companies:

Years.	Boston Manufacturers Mutual Fire Insurance Co.	Arkwright Mutual Fire Insurance Company
1850-60	$4.37	$3.37
1861-70	2.79	3.00
1871-80	2.54	2.16
1881-90	2.37	1.54
1891-1900	1.44	.69
1901-1910	.68	.43
Year 1910	.44	

The Good of the Insurance Premium

Possibilities no less alluring are open to the social and industrial engineer. Will the community support their efforts?

Consider how great would be the incentive to humanize social and industrial conditions if the cost of inhuman conditions were not only made manifest; but had to be borne from day to day unless the inhuman conditions themselves were removed!

Mere description of the misery unnecessarily entailed by the inhuman conditions, mere statements of cost, however clear and forceful, will fail to secure the removal of these inhuman conditions in industry and in the life of our people from which this misery springs. But if society and industry and the individual were made to pay from day to day the actual cost of the sickness, accident, invalidity, premature death, or premature old age consequent upon excessive hours of labor, of unhygienic conditions of work, of unnecessary risks, and of irregularity in employment, those evils would be rapidly reduced.

We need a comprehensive system of workingman's insurance as an incentive to justice. We need it "lest we forget."

THE CONSERVATION OF VISION.

What It Means; Why It is Needed; How It Can Be Accomplished.

IDA B. HILTZ, Secretary, American Association for the Conservation of Vision.

In its broadest sense, conservation of vision includes the prevention of all causes and the amelioration of all conditions which tend to the destruction or impairment of eyesight.

The eyes are the most important of all the sense organs. Most of our knowledge and practically all of our conscious actions depend directly or indirectly upon accurate eyesight. Besides injuring the eyes themselves their improper use may greatly reduce the efficiency of the individual by producing serious physical illness, particularly if errors of refraction and therefore, in general terms, eyestrains are uncorrected.

Vision may be totally lost as a result of disease or accident at any period of life from infancy to old age. It is estimated that there are one hundred thousand persons in the United States who are either absolutely or practically blind. The blindness of the majority of these persons could have been prevented.

One-fourth of blindness from all causes is due to infectious diseases which are subject to well-nigh perfect control. Hundreds of infants annually lose their sight by infection of their eyes at birth, and this infection is almost entirely preventable by the adoption of simple measures.

Trachoma is a communicable disease of the eyes which is rampant in the remote country districts of several states, and in these regions thousands of persons are being gradually blinded for want of proper care and attention. This disease is also prevalent among school children in the larger cities. Trachoma can be prevented and either cured or greatly relieved by proper treatment.

Several thousand serious accidents to the eyes occur annually. The majority of these accidents are the result of carelessness and ignorance regarding the practical means for their avoidance, and many are caused by improper lighting of factories and shops.

Owing to the neglect of a few simple precautions the eyesight of many children is impaired and the danger in this respect is so great that it sometimes results in practical loss of vision. Imperfections in the eyes themselves which can be readily corrected with glasses; overwork, and improper illumination impair or ruin the eyesight of thousands of children and thus destroy their usefulness and happiness for life.

Improper methods of artificial lighting are so common that really good lighting is a comparatively rare exception. Conditions today demand the performance of a large amount of work by artificial light. The amount of eyestrain, with its attendant disorders, due to improper lighting is enormous and wholly needless. The reduction of the efficiency of all classes of workers from this cause alone entails a loss of millions of dollars annually to employers.

To reduce the amount of physical and mental suffering and financial loss resulting from destruction or impairment of the eyesight is the object of The American Association for the Conservation of Vision.

Scope of the Work.

The conservation of vision directly appeals to every individual, for no one is exempt from impairment of sight by accident, disease, or by the improper use of the eyes.

In order to accomplish its purpose most effectively the work of the Association has been divided into six different departments as follows:

Department of Disease and Defects of the Eye;

Educational Department (hygiene of the eyes in schools);

Industrial Department (hygiene of the eyes in factories, stores and offices);

Department of Statistics and Information;

Department of Legislation;

Department of Publicity.

Each of these Departments is conducted by a Director, with a staff of five or more associates, and such special committees as may be found useful, the work of all departments being co-ordinated by the general supervision of the Board of Managers and the constant assistance of the General Secretary.

The activities of the Association will be directed:

First: to collecting and co-ordinating existing information on the various matters pertaining to the conservation of vision.

Second: a careful and impartial investigation of matters upon which present knowledge is either incomplete or inconclusive.

Third: to standardizing methods and practices as fast as definite knowledge can be obtained.

Fourth: to carrying on a general campaign of education in regard to the proper care and use of the eyes.

Fifth: to securing legislation tending to prevent wilful or ignorant practices which result in injury to or destruction of vision.

To insure an impartial review of conditions and sound conclusions from existing knowledge of the various subjects and unbiased investigations, the personnel of the Departments and Committees of the Association will be confined rigidly to the profession and to laymen who have no commercial interests, directly or indirectly, in the objects of the Association. Every necessary precaution will be taken to obtain the most accurate and authoritative scientific facts.

The work of educating the public will be done through the frequent issuance of bulletins on special subjects, by lectures, by exhibitions, by co-operation with other scientific and humanitarian organizations, and publicly through the newspaper and periodical press.

The American Association for the Conservation of Vision is the outgrowth of a movement having its origin in a desire to prevent blindness from infectious disease, and which gradually developed and extended its purpose until it included the prevention of all causes of impaired vision.

The following organizations and committees were instrumental in this movement, and will be actively affiliated with this Association in its work:

Committee on Prevention of Blindness of the Russell Sage Foundation;

Committee on Prevention of Blindness of the New York Association for the Blind;

Maryland Society for the Prevention of Blindness;

Ohio State Commission for the Blind;

Massachusetts Commission for the Blind;

Kentucky Society for the Prevention of Blindness;

Arkansas Association for the Prevention of Blindness;

Missouri Association for the Prevention of Blindness;

California Association for the Prevention of Blindness;

Committee on Prevention of Blindness of the American Medical Association;

Committee on Conservation of Vision of the National Educational Association;

Illuminating Engineering Society;

Committee for the Blind of the Council of Jewish Women.

Membership in the Association is open to all who are interested in any way in any of its objects. Members are sought rather as a channel through which to promote the objects of the Association than as a source of contributions, financial or otherwise. The membership fee is $1.00 and the annual dues after the first year are $1.00.

The constitution provides that all those who apply for membership during the first year and pay an initiation fee of $5.00 shall be enrolled as Charter members. It is believed that the objects of the Association are such that many will wish to contribute this small additional amount to its foundation. The annual dues for Charter members will be the same as those of the regular members, namely, $1.00 a year.

Both classes of members will receive the general bulletins of the Association.

The ultimate value of the work of the Association will depend primarily upon the funds available for its use. Those desiring to further the work for scientific or humanitarian reasons are invited to make further contributions. If desired, such contributions may be made for specific purposes.

There is pressing need of immediate work of the Association in all departments. The officers of the American Association for the Conservation of Vision are: President, F. Park Lewis, M. D.; vice-president, E. Leavenworth Elliott; secretary, Ida B. Hiltz; treasurer, Samuel E. Eliot. The offices and headquarters are in the United Engineering Societies Building, 25 West 39th street, New York.

STRIKES IN BUENOS AIRES.

(Compiled in the Bureau of Manufactures from reports by Consul General R. M. Bartleman of Buenos Aires, and from the Boletin del Departmento Nacional del Trabajo.)

According to statistics gathered by the National Department of Labor there were 298 strikes in Buenos Aires in 1910, as against 148 in 1909 and 118 in 1908. These strikes affected directly 18,806 workers and the most frequent underlying cause was a demand for increased wages and the 8-hour work day. In the majority of cases the workmen were successful, the Department of Labor intervening in many instances with its good offices.

STATE SAVINGS BANK INSURANCE.

Two years ago last November through the efforts of Louis D. Brandeis state savings bank insurance was started in Boston.

Formerly insurers of small sums sent agents from house to house to collect the insurance premiums. This method was an expensive one and as usual the insurer paid it by paying large premiums.

Mr. Brandeis first conceived the idea that the state banks have an insurance department so that poor people might insure for a small sum at a reasonable rate.

A SERVICE DEPARTMENT IN A SMALL BUSINESS*

JANE SEYMOUR KLINK

Within the last two decades changed conditions in the industrial world have developed a new profession, Human Engineering. Great business organizations have awakened to the importance of caring not only for the costly machinery they possess, but for the men and women behind the machines. From small beginnings, the human engineer, sometimes known in shop and factory as the service or welfare manager, has accomplished far-reaching results. There is no longer any question concerning the commercial value of what at first appeared to be an experiment in philanthropy.

The need of service work is apparent to any thoughtful person who contemplates conditions wherever large numbers of workers are employed, but its possibilities are barely suggested to the casual observer who has not made a study of the principles underlying it.

In every business certain elements are necessary to success. Business is conducted on the credit system; therefore, it is better that the term of credit be long and the rate of interest low. If there is anything likely to disturb credit, if there is anything which is likely to interfere with the operation of the business, such risks will be taken into consideration and will make the term of credit shorter and the rate of interest higher. Stability of organization is of first importance in any business concern.

In this day of organization of both employees and employers it too often appears as if an armed truce existed in place of a peace pact of co-operation, and that any moment, serious conflict may occur. Is there anything that can reconcile these opposing forces and enable them to operate together with less friction? Is there any one interest common to both, which is so vital to both that their common livelihood is dependent upon it? Naturally, the one answer is the work itself, and the fact that the service movement, rightly conceived and wisely managed, does bring about the desired result is the first reason for its existence.

The attitude of employees toward their work, toward their employer and toward themselves is of greatest importance. If they are glad of the opportunity to work and anxious to perform their various tasks as well as possible, they will be easy to train, because their anxiety to learn will give them patience and a teachable spirit. If they can be made to understand that their work is worthy of their greatest interest and respect, sullen acquiescence will be changed to cheerful obedience. The attitude toward the employer will be entirely different when employees begin to feel that they are working with the head of the business and not for him. *With* implies confidence and co-operation. Employees who have this conception of their relation feel that they are not working merely for a living, or for the wealth of the employer, but that it is a profit-sharing enterprise which engages their attention. Each is laboring for the other's welfare. The task is measured by neither its difficulty nor its duration, but by its importance to the common good. It becomes a question of relationships, reciprocal obligations, mutual respect and good will.

A vital factor in any business operation is the efficiency of the employee.

*(Address given before the Business Men's Group of the Ethical Culture Society of New York, March, 1911.)

Efficiency is a compound of many things, but certainly the first element is permanency. All employees are not addicted to the habit of seeking short and intermittent jobs, but it is perfectly true that

"The fault of this age is a mad endeavor
To leap to heights that were made to climb;
By a burst of strength or a thought that is clever
We seek to outwit and forestall Time."

Short cuts are the fashion and money the object. Every boy hopes that he may have a stroke of good luck without working for it; every girl has visions of a millionaire as her Prince Charming. It is amazing how men and women give up positions without a thought of their loss in chances for slow and steady advancement. Domestic service is only one example of a vocation in which the transitory character of the employees is displayed.

Service work does make for stability of organization, since it encourages the contentment and efficiency of employees. Given stability, efficiency and contentment, and half the business problems vanish into air. Service work seeks to educate each employee to the level of his highest efficiency. It must benefit not only the employee but the employer as well. If it benefits the employee only it is paternalism and patronage; if it benefits the employer only it becomes exploitation of labor. Its motive power must be interest in the common value of the common task. It encourages the feeling that nothing is too small to be done well. By the standardization of the quantity and quality of work to be performed by each individual, it is possible to bring about the better performance of tasks and the consequent shortening of hours and raising of wages.

The practical application of the principles of service work has demonstrated that altruistic theories can be successfully applied to everyday problems. The story of what has been accomplished in a certain steam laundry will illustrate exactly how this human engineering affects workers and increases the general output of a plant.

The laundry employs two hundred and fifty persons, about seventy per cent being women and girls above the age of sixteen. In such a plant the problems to be solved are: irregularity of work, long hours of labor and transitory help. The firm faced these conditions as other laundries have faced them, but the efforts to find the right remedy were directed in a new channel, so far as steam laundries are concerned. The members of the firm endeavored to improve conditions by looking at their employees from the human point of view instead of contemplating the workers as mere mediums for the accumulation of dollars and cents. They had to undergo much good-humored ridicule when they began to apply what were termed "foolish ideas." However, they were not daunted in their efforts. They reasoned that they desired to make a reasonable profit, and that they could do their best work under favorable conditions. They knew that they could not be happy in their work or able to do their best, if the hours of labor were excessive. Their employees were human, even as they were, and the same course of reasoning, therefore, would apply with equal force to the workers. The principle upon which the service work was started was a sincere endeavor to make a practical application of the golden rule, but at the same time to adhere to business methods and to avoid all superficial sentimentality.

The routes were organized so that, as far as possible, each customer's washing might be called for and delivered at practically the same hours each week. The customers courteously responded to the request that their

clothing should be ready on time and their forethought was repaid by the prompt return of bundles. Thus by this established regularity employees were enabled to work steadily. The next thing was to reduce the number of working hours a day. This meant standardizing the work. The manager and superintendent, both of whom were able to perform every operation in the plant, studied each one of these several operations in order to prove two things: first, the best method of doing the work; and, second, what reasonable time to allow for each performance. The manager went out on the floor and taught the forewomen the easiest way of accomplishing each task; the forewomen in turn patiently taught the employees in their departments to do exactly what had been demonstrated by the manager. In other words, all were trained to be efficient, for efficiency means doing a thing in the best possible way with the least expenditure of effort.

The next step was to plan the work, dividing it into lots, so that each lot should enter and leave a department at specified times. These lot schedules were hung in all the departments and thus each employee knew just when a certain amount of work should be finished. If it were sent on ahead of time there was reason for rejoicing; if behind time, the schedule was an incentive for catching up. The manager said to the employees: "If you will do your best to finish your work on schedule time for a certain period, you will make it possible for us to do something that will show our appreciation of your efforts." In many cases the lots were finished ahead of time and when the promised reward was earned the manager asked what was wanted. The reply was: "A lunch room."

A lunch room was provided and a cook engaged. Committees to attend to the catering and serving were chosen from among the employees. The lunch room was such a success that a rest room, with library and piano, was added. Previous to this a factory committee composed of one member from each department had been organized and this committee, through its several sub-committees, took charge of various activities, including the visiting of the sick, the charge of the library, care of the piano, etc.

It may be asked: How did the habit of finishing on schedule time make possible all the comforts provided by the management? Waste was eliminated. Extra fuel and extra gas, as well as wages for overtime, were not necessary. The standard of efficiency improved, after the schedule kept each worker up to the mark, so that fewer persons were needed in the various departments. Space and overhead charges were perceptibly lessened and thus it was possible to pay better wages.

When the success of co-operation had thus been demonstrated, a service worker was engaged and it was then possible to increase the scope of the numerous betterment schemes that were so well started, and carry out the ideals of the management in fuller detail.

One of the most vexing problems with which the management of a laundry must deal is the transitory character of help. A large percentage of persons who apply for places in a laundry belong to the class of unskilled labor. Many factories use such help and there is often a job to be had for the asking. Three things concerning this class of unskilled labor are amazing. One is that family necessities are usually offered as a plea for a place, while possible fitness never enters into the applicant's list of reasons for having a chance to draw wages. A second surprising thing is that, no matter where the average girl has been working, whether in a department store or a canning factory, she demands at least the amount of her last salary. The fact that she knows nothing about the new tasks is never taken into consideration. A third peculiarity of unskilled workers is that, without any excuse, they will give up positions in which they are

earning fair wages. The great question is how to make those who are "taken on" permanent, efficient workers, useful to themselves and to the firm as well. The books of the laundry show that in one year two hundred and twenty women and girls, who had been employed less than two months, left the firm. Few were discharged and most of them, in leaving, obeyed the whim of careless indifference that characterizes so large a proportion of the untrained.

Soon after the service manager began her work in the laundry the plant was burned. Nothing was saved, except one chair, and the employees' loyalty was put to a severe test. It was near the holiday season when it is difficult to hold together such a force of employees as that of a laundry because every department store advertises for extra help. The management assembled the two hundred men and women who were on the laundry's pay roll and frankly told them that in order to carry on business and provide them with employment, the only possible temporary arrangements for work would entail certain hardships. A certain number would be assigned to a loft hired for the purpose and others would be sent to various laundries in Greater New York, while one shift would be compelled to work all night. These were not pleasant conditions to face, but the spirit of loyalty was so strong that not three per cent of the employees declined to endure the unavoidable inconveniences. In less than two months the entire force was reunited in temporary quarters where space was at a premium. Nevertheless, it was found possible to give the service department a well-lighted room, eight by thirteen feet in dimensions.

The firm furnished this room with a small gas stove, a ten-gallon steam boiler, a sink, a table, shelves and cooking utensils, and paid for the services of a woman who gives about five-sevenths of her time to this department. A nourishing luncheon is prepared here every day for all who desire to pay for it. The number of patrons, mostly women, averages from thirty to sixty a day. Bread and butter are not supplied as it is cheaper to carry them from home. The food is the best quality that can be procured and the cooking is good. Tea, with cream and sugar, is served for two cents a cup. One substantial meat with a vegetable is prepared each day and there is always a dessert. The menus for the week comprise cornbeef hash, pork and beans, roast lamb and a vegetable, meat balls and a vegetable, Spanish stew and beef a la mode—all supplied for from five to seven cents a plate and each portion is abundant for a hearty meal. Soups cost from three to five cents and include pea, bean, corn, tomato, vegetable and beef, in addition to mutton-broth and clam-chowder. On Fridays fish is served with a vegetable; this costs six cents. For desserts, baked apples, stewed prunes and rice or tapioca pudding may be had for three cents. Everything is cooked in the kitchen and served hot. In summer ice cream, fruits and salads are offered at the lowest possible prices.

The little lunch room has prospered so amazingly that it pays not only for itself, renewing its equipment whenever necessary, but for all medicines used by the service manager; and, in addition, it earns enough money to meet the rent of the piano and the expenses of a monthly paper. Moreover, the lunch room has a bank account.

In a corner of the lunch room the service manager has her office. There she keeps among other things—journals, records and account-books—a small circulating library. She also dispenses medicines. These medicines are simple remedies, concerning the administration of which a physician is consulted. It is astonishing how much the drugs are needed. In a year more than seven hundred prescriptions were given. The office

is a station of the Penny Provident fund, and in 1910 the laundry employees deposited more than a thousand dollars.

The small library is much used. In 1910 more than 1300 books were given out, and, what is better, they were read.

It is the duty of the service manager to keep a daily record of absences and tardinesses, a journal of significant happenings, and a careful expense account. In her spare moments she edits the little paper, which appears each month.

The routine of work in the eight by thirteen room shows that it is not so much space that counts as what is done in a given space. But the things that do not show comprise the greater part of the service worker's responsibility. Since service work is the education of each individual to the level of his highest efficiency, the education begins at the top. A meeting of the overseeing help is held once a month in the service manager's office, with the president of the laundry company in the chair. At these meetings, the policy of the firm regarding hours and conditions of work is discussed, suggestions are offered and improvements initiated. The relation of the forewomen to the persons in their departments is particularly dwelt upon. Perfection of work is of first importance, but the right way to produce that perfection is of the utmost significance, since the wrong way can not be enduring. A forewoman is expected to see that work is properly done. She is not to do the work herself, but to infuse the spirit of working into all who are in her department. She should never say, "Hurry!" Instead, she tries to teach each worker to be so exact that there is never any necessity for haste. She must treat each worker as an individual, whose characteristics are to be studied, and whose efficiency is to be promoted through a patient process of elimination.

The result of this policy is most satisfactory. Formerly, if anything was wrong, or a garment missing, the answer to an inquiry was, "Oh, I'm sure that could never have happened in my department," but now the sentence has changed to, "It may have occurred here. I'll be glad to see." The forewomen have learned to consider the importance of the work before that of their personality.

"I'm ashamed of something I said to one of the girls, today," confessed a forewoman. "I didn't call her a blockhead, but I said I couldn't see how she could be so blockheaded about her work."

The admission of hastiness in speech proved that the forewoman was measuring up to a higher standard of living, that she was becoming big enough to forget herself.

The factory committee meets once a month in the service-manager's office. In a way, this committee represents the firm, as well as the employees, for the plans outlined in the committee of overseeing help are discussed and through this second committee they are carried into the various departments. But the committee has a double duty, for it voices the employees' needs. Vexed questions are brought before it, the roots of discontent are laid bare and grievances are aired. By this means the management and the employees are kept in touch with each other.

There is a third meeting deemed of supreme value in keeping the human machinery of the laundry in smooth running order. That is the weekly conference over the pay roll. At this conference the president of the company, the superintendent and the service-manager weigh the individual value of each worker and consider reasons pro and con, for changes in the wages of employees. Causes that should justify raises in salary are taken up and rates for piece work are discussed and agreed upon.

The laundry employees have a mutual benefit society, which they manage themselves. The dues are payable weekly and are five or ten cents, according to the salary. The association pays to members who are ill and can present physicians' certificates, five dollars a week for a period not to exceed eight weeks in any one year, while the firm makes up the difference between the five dollars and the amount of the regular salary.

The men and boys maintain a flourishing athletic association, and the members make a creditable showing every year on field day, when there are contests in racing, running and jumping, in addition to the annual base ball game, in which the nine sent by the employees of the Philadelphia branch of the laundry play the Brooklyn nine. A trophy is given by the firm.

The value of proper recreation is appreciated by employer and employee. The recurring question is: What can be done for amusement? Two social clubs, the members of which are drawn more largely from the marking, sorting and shirt departments than from the other groups of workers, hold meetings at the various homes. From time to time excursions for all the employees are arranged by the firm or the service-manager. In the winter time chorus-classes, sewing-classes and cooking-classes flourish. Literature classes, at which Shakespeare and Chaucer were studied, existed until it was necessary to discontinue them because the temporary quarters of the laundry afforded no suitable meeting-place.

Drivers and wagon boys enjoy a quarterly dinner cooked in the plant At these dinners their particular problems are discussed. The treasurer of the company presides at the dinners and brings to the men kindly criticism of mistakes, suggestions for improvement and hearty commendation for work well done.

Every Tuesday at noon the employees assemble on the first floor of the building to listen to a short talk by the service-manager, or one of the officers of the company. These weekly sermonettes are often helpful in correcting faults, which it may not be wise to take up individually. They concern subjects relating to physical, moral, mental, and social well-being, which in the opinion of the management should be brought before the employees.

Work in the laundry begins at half-past seven every day but Monday. Four mornings in the week the service-manager is in her office a quarter of an hour before time to start the machinery. This gives an opportunity for a kindly word or an interested inquiry. If any are late it affords a chance to find out whether breakfast has been omitted, and, if so, to supply the omission. If there is any one absent, the service-manager, who has a horse and carriage at her disposal, makes haste to find out the cause by calling at the home of the absentee. If the excuse for not reporting for duty is flimsy, an effort is made to send in the delinquent. If it is the intention to leave the employment of the laundry without notification, that fact is discovered and the vacancy is filled without delay. If an employee is ill, sympathy is expressed and help is offered. These calls average about five hundred a year.

A service pin of blue and silver is worn by each employee who has been connected with the plant for a year, and, as time passes, a number announcing length of time is hung from the pin. When an employee has been in the plant five years, the silver pin is replaced by a gold one, which is the property of the wearer, and the numbers are hung upon it as the years roll by. At the expiration of ten years the gold pin is encircled with a wreath.

Vacations of one week with full pay are given to employees who have served one year. All who have two or more years to their credit have a week with nine days' pay.

In this laundry the service-manager has no responsibilities, so far as the technical part of the work is concerned. It is her part to give help at any time it is desired, in any way possible, and as much as is needed. It is her privilege to foster the growth, little by little, of the seeds of happiness, contentment and well-doing, to watch the development of efficiency on the part of employees, and to know that all are working together in a brave, strong effort to help themselves and one another. The results of this application of high principles to everyday business, this practical demonstration of what the golden rule measures in human relations may be briefly summarized in a few words:

First, the pay of the individual worker has been raised, while the average percentage of the pay roll as compared to the gross receipts remains about the same.

Second, more work is done in less space, in less time, and with fewer workers; hence the elimination of space and power charges and increase of wages is rendered possible from another point of view.

Third, the workers are well organized in the common interest of working together. They are cheerful, contented and are in good physical health.

Fourth, the firm, less than five years after a disastrous fire, is erecting one of the largest laundry buildings in the United States at a cost of $250,000.

To summarize: It is simply a successful practical effort to give each one a square deal.



A TOP NOTCHER SYSTEM FOR SALESMEN.

D. C. Lowles, Service Department, The Sherwin-Williams Co.

The system or plan explained in this article, although used by a Paint and Varnish house, is in some measure at least applicable to almost any business employing a large field force.

This Top-Notcher System or Competition was designed to encourage each man to do his best, to bring out the spirit of striving after excellence, as such effort is just as great a help in developing the individual as in developing the business, and unless a man makes the most of himself he cannot make the most of his business.

The first step in the system is to establish for each man a careful estimate of the business he ought to do. In making this estimate a careful analysis is made of the previous sales, both for the various lines sold and the kinds of business sold. Increased or decreased prices are taken into account, as are also general business conditions and the special conditions on each territory. This estimate is made by the Sales Manager, and revised by someone higher in authority, either the General Sales Manager or the President of the Company.

The need for this care is that the estimate must be above suspicion, based upon facts and past experience, and absolutely attainable by the salesman. Any carelessness in making up the estimate will defeat the object of the plan, as each salesman must accept without question the estimate given, as a fair measure of his possibilities for the coming year.

Every salesman reaching his estimate receives a liberal bonus, equivalent to from 5% to 10% of his salary. In addition to this bonus or "estimate money" there is allotted to each division, comprising say 25 salesmen, 3 cash prizes, 1st, 2nd and 3rd, for the men making the best all-round showing. This is strictly competitive and is based on points given for the best gain in sales, the lowest percentage of deductions and expense, the highest average on Territorial work (showing close co-operation with the office), the largest number of orders taken, and many other captions, all intended to show which men are carrying out the Company's policy, handling their work in the best and most profitable way, and qualifying for advancement when the time comes.

Similar prizes are given for those making the best showing of the whole force, and special prizes are often awarded for stimulating work on special lines.

Those men who win the competitive prizes in each division are known as the Top-Notcher winners and together with the winning Managers, Superintendents, etc., make up the Top-Notcher Club for the year. The badge of the Club is a distinctive solid gold pin engraved with the winner's name and the year the prize was won. Should anyone win membership in the Club for several years, as some have, the same distinctive badge is used as a scarf-pin, watch fob, cuff buttons, etc. The honor of belonging to this Top-Notcher Club is an important factor in the success of the plan.

This Competition or Top-Notcher System has been in force for many years and has proven its effectiveness. Possibly its greatest value from the Company's standpoint is that it enables the President or General Manager to find the best men and mark them for advancement when opportunity offers.

STANDARDS OF SAFETY FROM FIRE IN FACTORY BUILDINGS*

By Peter Joseph McKeon

At this time when there is a sudden haste to safeguard factory buildings, it is perhaps well to remind ourselves that we are dealing with a problem that has existed for decades and even centuries.

Factory buildings almost from the beginning of Fire Insurance have been noted for many fires with great destruction of life and property. As a class of buildings, the fire insurance companies have protected their financial risks by charging high premiums. The property danger accordingly has received some attention, but the life danger has been practically forgotten and ignored.

It has indeed required the death of 145 girls and women lately under distressing circumstances to arouse the interest of the public in the fire danger.

The death of these persons has been a sacrifice that will probably not be entirely vain. It has stirred the apathy and neglect of fire danger and created a new interest and a new activity that is represented by a permanent organization to deal with the fire problem as similar organizations have been dealing with other social and economic problems.

If there has been apathy and neglect, it must not be overlooked that hand and hand with indifference or oversight goes ignorance. Yet, in the present crisis many well intentioned persons, who before this fire hardly knew a fire pail from an automatic extinguisher are today prescribing remedies and calmly laying down technical recommendations as if they had devoted their lives to that particular calling.

Employment of an Expert.

It is proper and necessary therefore to sound a warning and accompany it with a suggestion; give the expert a chance to be heard. If a plague or an epidemic fell upon the city, we would turn to the physicians and the medical institutions. If any other problem of emergency confronted us we would seek both specialists and trained workers for advice and assistance. In the same way as the problem of safety from fire deals with fire as a social and economic phenomenon, why not call upon the fire experts for the solution. In other words, the first standard to be established for safety from fire in factory buildings or any other building, is the employment of competent persons.

Safety from fire is today on the basis of an applied science, and there are engineers equipped and ready to apply the principles of this science. In making a plea for the employment of fire engineers, it is not necessary to make it as a matter of opinion. The simple fact is that the applied science of fire prevention has been in existence for nearly 40 years and as it is a New England institution it is indeed fitting that a brief statement of it should be given in the city wherein it originated.

It is to the late Edward Atkinson and his associates that the honor and credit of establishing fire prevention as a science belongs. Mr. Atkinson was a man of so many activities and pronounced abilities that he hardly needs any introduction to this audience. His life was so filled with usefulness that one of his most important contributions is in reality little known. It will no doubt be a surprise to the many who know of Mr. Atkinson in connection with political, economic and charitable affairs, to learn that he is entitled to be called the founder of fire prevention as an applied science.

Mr. Atkinson was the owner of a cotton mill and as such became a member of the factory mutual fire insurance organization. He became president of the Boston Company in 1878, although he had been a director in the company since 1865. When he became president and studied the conditions of his

*Read at the Conference of Charities and Corrections, June, 1911

own company and of the mutual system as a whole, he realized that it must be reorganized or the system would fail. It had been started in 1849 by Ebenezer Allen, a cotton manufacturer of Allendale, R. I., and he had had fair success for about 30 years. It had, however, been conducted on a purely empirical basis and, in fact, depended on the memory and judgment of one or two men. A number of serious fires convinced Mr. Atkinson that the mutual system could no longer be safely conducted on the existing methods and he went to work to establish it on a scientific and engineering basis. He undertook what was probably the first scientific study of the causes of fire and for this purpose started an embryo laboratory in the basement of the company's building at 31 Milk Street, Boston. This was undoubtedly the first fire laboratory in the history of the world. Mr. Atkinson thus applied scientific research to the fire problem, and he supplemented this by the employment of engineers to apply the results of the research. It is a simple tribute to Mr. Atkinson's breadth and clearness of mind that he was able to grasp the necessities of such a problem and to call in technical men fitted to perform their part of the work. It is only a matter of justice that Mr. Atkinson's associates and co-workers should be mentioned at this time because he himself was unsparing in giving them due praise for what they did.

These men include the late William B. Whiting who was the practical insurance man of the organization and also the contributor of one of our standard fire prevention appliances, namely, the use of wood covered with lock jointed tin. Mr. C. J. H. Woodbury is probably entitled to be called the first fire engineer, because he was the first technically trained man that Mr. Atkinson brought into the factory mutual system. Mr. Woodbury's particular contribution to fire prevention was the drafting of electrical specifications and automatic sprinkler specifications which even today have not been materially changed since they were first drawn up in the seventies and eighties.

Mr. John R. Freeman, who is well known as an authority on water supply was asked by Mr. Atkinson to investigate the subject of water supply for fire purposes and with his associate, Mr. F. L. Pierce, designed the underwriter's fire pump, which is also one of the standard fire prevention appliances. Mr. Joseph P. Gray is another of the engineers who assisted Mr. Atkinson in the development of fire prevention, and he is today Mr. Atkinson's successor. The late Professor John M. Ordway, of the Massachusetts Institute of Technology, performed the original fire research for Mr. Atkinson. The late M. M. Tidd, John R. Francis and the Hon. Byron Weston are also to be mentioned for their part in fire prevention.

This brief statement is decidedly germane to the subject of this address because the results of fire prevention as applied to the factory mutual buildings was the establishment of standards that are almost universal in their application. It is true that these standards were worked out for mills and factories, but their basis is so fundamental that they can be applied to all classes of buildings.

The first of these standards has already been stated, namely, the employment of a fire expert. That was precisely what Mr. Atkinson did and what is being done today in all the buildings under the factory mutual system. An expert is sent to the building as the first step. He makes a study of the building, applies the principles of fire prevention to the existing conditions and his report includes specifications for making the property safe.

Safe Construction.

The second standard is the standard of safe construction. The building is the focus of the problem of safety and as such it is truly the ground work

of the solution. It is easier to say that a building shall be safe than it is to have people grasp the principles of safety. Safety is not to be found in any one type of structure or in the use of any one kind of materials. The truth of this is perhaps better realized today, as a result of the many disastrous fires in the so-called fireproof buildings. The Washington Place fire with its toll of 145 lives occurred in a fireproof building and a fireproof building that was indeed better than the average. It is in fact the type of building that many people have been demanding for years as a requisite for fire safety and many of the newly proposed remedies call for similar, if not identical structure.

It is therefore to be hoped that this fire among its other benefits may forever kill the belief that safety lies in any type of building or any form of construction. It is not the kind of materials that counts so much as the use that is made of them. Incombustible materials or fireproof materials are valuable and an assistance as far as they go, but they can be so used as to create danger by providing a sense of false security. The buildings of the factory mutual system, for example, are not fireproof in the common acceptance of the term. They have wooden floors and wooden structural members, but in spite of this supposedly inflammable construction, they are the safest buildings of their class in the world. Many of the factory mutual buildings, in fact are built entirely of wood, but even those buildings are far safer than the overrated fireproof buildings.

The secret of safe construction is the design and the use of materials to prevent the starting of fire and its rapid spread. Mr. Atkinson and his associates laid down the rule that wood used in factory construction should be plank and solid timber, so that there should be no flimsy packing box pieces arranged to feed the flames or permit fire to burn through a floor as if it were made of pasteboard and cheese cloth. They also laid down the rule that all stairways, elevators and other openings through the floors should be enclosed and barred to the fire so that it could not use them as a passage way from one floor to another.

It has been said that the structure is the locus of the fire and its importance could not therefore be overestimated. However great a factor it may be, it is not the only factor, and consideration of it alone does not secure safety. Fire is a phenomenon that for efficient control requires prompt discovery, the prompt application of extinguishing measures and the provision of retarding or confining measures.

The third standard of safety therefore is the equipment of a building with fire appliances. These appliances are mechanical devices which are self operating in many cases, or mechanical devices to be used by the occupants.

Equipment With Fire Appliances.

For the discovery of fire, there are available automatic fire alarms or detectors, which are self operated by the heat of the fire and which ring alarms or give signals to the fire department or the persons in charge of the building. The use of these thermostats, as the automatic fire alarms are technically called, is supplemented by the employment of watchmen or fire patrols who regularly patrol a building and are required to visit every part of the premises during each hour. These watchmen are in fact, simply human fire alarms and being human they are expected to fail in their duty more or less, so that a system of control has been established for them. The movements of these fire watchmen are recorded by means of watchmen's time detectors of which there are three types in use. One is the portable watch clock, which the watchman carries with him, and in which he makes records of his movements on a paper clock dial contained in the watch clock. Another is the stationary watch

clock, which is located in the office or some other place and the watchman makes records upon it by means of electrical connections, placed throughout the premises that he is expected to patrol. The third is the central office system which maintains telegraph connection with buildings in which the watchman is employed. To this central office the watchman transmits signals according to a regular schedule of time and place and if his signals do not arrive at the appointed time, the central office dispatches a runner or roundsman, to find out why the watchman did not report as required.

The automatic fire alarm and the watchman are considered fire detectors especially, but there is another appliance that performs this service as well as its own particular service, namely, the automatic extinguishing of fire. It is especially fortunate that there is available an effective and reliable fire extinguisher, which is not dependent for its action upon any human act, but depends on the fire itself generating sufficient heat. Sufficient heat in this case means simply 155 degrees Fahrenheit, which is very little above the temperature of Turkish baths and in fact is a temperature that the burning of a match will produce. In other words, the automatic fire extinguisher is so sensitive and responds so quickly that it is operated by holding a match underneath the appliance.

Automatic fire extinguishers are technically called sprinklers because the prototype was a perforated pipe, which discharged water much as a sprinkler cart does. In the development of automatic fire extinguishing the perforated pipe was displaced by an appliance which is really a special type of water faucet and could be called an automatic water faucet or an automatic shower, because that is the form in which the water is discharged from it. The automatic sprinkler device itself is technically called a "head" and the automatic sprinkler system consists of a number of "heads" attached to pipes which are hung close to the ceilings of buildings. It is the function of the sprinkler head to discharge the water; it is the function of the pipes to act as a distribution system and convey the water to the heads while the water for use in case of fire is supplied from various sources. These sources are in most cases tanks of water, either elevated above building sufficiently to produce pressure by gravity fall, or the tanks are pressure tanks and the water is placed under pressure by the use of compressed air. In addition to the use of tanks as sources of supply, fire pumps may be installed, or the city fire engines can pump out the sprinkler system, or the regular city water mains in the streets can supply the sprinkler systems direct, if there is sufficient pressure for the purpose.

In addition to means for automatic extinguishing of fire there are available a number of appliances to be used by hand. Foremost among them is a pail of water. This was undoubtedly the first fire extinguisher and it is even today the extinguisher most generally used. In fact there are records showing that more fires are extinguished by the use of pails of water than any other means. The fire pail is cheap. It can be installed anywhere and its use is understood by practically everyone. Fire pails are of course objectionable on esthetic grounds, so to overcome this there are manufactured what are called bucket tanks. These are simply metal tanks or barrels of water, in which are placed 6 or 7 pails; in case of fire the cover of a tank is raised and pails of water are drawn out of the tank. Bucket tanks are used in hotels, department stores and office buildings where the ordinary fire pails are considered unsightly.

Next to fire pails the most common form of hand fire appliance is the chemical extinguisher. This is a copper tank with a small hose attached for

the purpose of directing the stream of water. The tank holds about three gallons of water in which has been placed some bicarbonate of soda. A small bottle of sulphuric acid is suspended within the tank with a loose stopper so that when the extinguisher is turned upside down, the sulphuric acid is mixed with the soda solution and the chemical reaction produces carbonic acid. This gas is an extinguishing agent in itself and when carried along with the stream of water helps to extinguish the fire, but its principal purpose is not as an extinguishing agent, but to put the water in the extinguisher under pressure so that the stream can be thrown some distance. The advantages of these carbonic acid gas extinguishers over pails of water are several, particularly that the water can be thrown a greater distance and directed better, while the larger quantity of water makes the extinguisher a more powerful and dependable appliance. There are also other small fire extinguishers; hand grenades which are glass bottles of chemical solutions to be thrown at the fire; dry powder extinguishers, which are metal tubes containing bicarbonate of soda, or other material which forms a gas when heated by fire, and a new type of extinguisher in the form of a syringe or hand pump. This contains a liquid, which forms an extinguishing gas when brought in contact with the flames and is useful in fighting the class of fires for which water is ineffective.

The fire hose attached to stand pipes is in reality a fire department auxiliary and should properly not be considered an appliance to be used by the occupants of the buildings under ordinary circumstances. If fire cannot be extinguished by fire pails or chemical extinguishers, it is in all probability too large and too dangerous to be attacked by others than trained firemen, so that if a fire is extensive enough to require the use of hose streams it had better be left for the attention of a regular fire department. This recommendation is qualified to some extent, where automatic sprinkler systems are installed because the sprinklers generally hold the fire in check and make it safe and advantageous for the occupants to use hose streams. In other situations where trained firemen are not available, the use of fire hose is of course desirable, but proper instruction should be given to the men who are to use it.

After fire appliances have been used as far as practicable, an additional safeguard is available in the form of confining or retarding appliances. These appliances are particularly fire doors and fire shutters or fire windows. As they are elements of construction, they should be considered under the operation of the second standard of safe construction. In the progressive steps of handling the emergency of fire, they really come into play after the fire appliances have been used on the theory that if a fire cannot be effectively extinguished, then efforts should be made to confine or retard it.

Fire doors are placed at doorways or other openings in brick walls which divide a building in sections or which separate one building from another. A brick wall is the best fire stop yet invented, but if it contains openings by which fire can pass through, it is of little use as a fire stop. Such openings are necessary for the ordinary transaction of business, yet they offer the grave danger of a fire in one building getting into another building and thereby doubling or trebling the size of the fire. For this reason one of the earliest steps in the working out of fire prevention was to devise a door, which should not only be fire resistant in its materials and construction but should also be arranged to close by itself in case of fire.

Iron doors had been originally used for this purpose on the presumption that iron being non-combustible would successfully resist fire. The presumption was an error, however, but the problem is to stop not only flames but heat, and the iron door signally failed to do this. The iron became red hot

and thereby transmitted great heat, while the door bulged and warped at the corners, thereby permitting free entrance for sparks and flames. In the search for a better fire door the idea was taken of using wood boards covered with tin applied with lap seams and lock jointed in the same way that the tinsmith applies tin to a roof in order to make it water tight. This combination of wood and tin proved highly successful and is still today the construction of the standard fire door adopted by all insurance organizations.

The discovery of suitable materials was one step. The next step was to secure easy closing and this was done by the invention of the sliding door, which was arranged to be hung on overhead tracks with rollers to make it easy to slide back and forth. The advantage of a sliding door over a swinging door for quick and easy closing is apparent. The swinging door requires mechanical force, either springs or weights to close it, while the sliding door when placed upon an inclined track requires simply that it be released, when the force of gravity causes it to close. The third step in the development of the fire door was an automatic release that would cause it to close when the fire occurred. This automatic release was invented by Mr. Atkinson who used a lever arrangement held in place by a piece of fusible metal. Fusible alloys, such as Mr. Atkinson used, were invented by Sir Isaac Newton, but Mr. Atkinson used this principle and made a fusible link. This consists of two pieces held together by solder which is melted by the heat of the fire, thereby breaking the link, and this in turn releases the lever, valve or other mechanism held in place by the link.

The perfecting of the fire door provided for the problem of openings in the interior walls of a building or in party or dividing walls between two buildings. There remained the problem of protecting openings in the exterior walls of buildings, that is, windows, in order to stop a fire from a neighboring or adjoining building extending to other buildings. This danger is technically called the exposure danger and represents the outside fire danger or the danger that a building faces on account of fire in its neighboring buildings or in the surrounding locality.

Window openings have been protected against fire by the use of shutters, which were originally made of iron and later of tin clad wood, following its successful use in the construction of fire doors.

Fire shutters have been generally installed on the outside of buildings, but they are sometimes placed on the inside walls, particularly since the development of rolling or sliding iron shutters.

The greatest development in window protection for fire purposes, however, has been made possible through the invention and manufacture of wire glass. This consists of a sheet of glass with a wire mesh embodied within the glass. It was originally designed to prevent the breakage of glass from ordinary blows or shocks, because its operation is such that when a sheet is broken or cracked, the pieces of glass are held in place by the wire mesh, so that the sheet of glass continues to fulfill its ordinary purposes. Its use for fire protection purposes was really an after thought, but it is today more widely used as a fire retardant than for its original purposes as nonbreakable glass. It is extensively used in skylights and other exposed places where natural illumination is desired but where the presence of glass offers an entrance for fire. It has made possible ideal protection for window openings, because it can be fitted into window sashes and window frames of regulation constructions. Thus the window opening is protected against fire by the same construction installed for ordinary building purposes instead of using a special construction such as shutters, which are also usually objectionable for esthetic reasons.

Fire windows in which the glass is wire glass have the frames and sashes made of incombustible materials, such as copper, galvanized iron, metal covered wood, or asbestos composition. They are also manufactured in the usual types of windows, that is sliding, swinging or pivoted windows. The use of a pivot window has made it possible to produce an automatic fire window which can be left open as well, yet will be closed if a fire occurs within a building, or is trying to enter from the outside. The automatic fire window is designed to hang on a pivot above the center so that when released the greater weight of the lower half of the window causes it to swing shut. It is held open by a chain in which is set one or more fusible links of the character used for closing fire doors and opening sprinkler heads, so that the melting of one of these links causes the window to shut of its own operation.

The fire door and the fire window are the two principal devices for confining or retarding the spread of a fire, but it is also a practice to install fire stops in the shape of walls or partitions which either sub-divide a large area into smaller and safer units of space, or confine a particularly dangerous process or operation to a single room or a reduced section of the building. Such fire stops are really elements of safe construction and are usually installed when the building is planned and erected, but they are frequently installed in older buildings, which were originally erected with little or no regard for fire safety.

The statement of the standards of safety has been made according to the order in which they would come into play in the case of a new building, that is to say, it is presumed that the fire expert would be called in to pass upon the original plans and specifications, to advise the selection of materials and their use, as well as to indicate the necessary equipment of fire appliances. A particular step that should be taken when the building is being planned and erected is the proper installation of heating, lighting and power apparatus as well as precautions or safeguards for other inherent fire dangers which may be a part of the use and occupancy for which the building is designed. A proper consideration for precautions and safeguards is therefore the fourth standard of safety. While this standard is placed fourth numerically, it is really first in importance, because it is a simple proposition that if a fire can be successfully prevented, that is the logical thing to do. It is working along the line of resistance, for it reduces or obviates the necessity for subsequent measures.

Precaution and Safeguards.

The prevention of fire as a particular and special function means the removal of all known causes of fire, or if there are present certain causes which cannot be removed bodily, then the safeguarding of these, so that their liability of producing or originating a fire is reduced to a minimum. While it is true that there has never been an adequate study of the causes of fire on a truly philosophical and scientific basis, it is a fact none the less, that most if not all the common causes of fire are perfectly well known. In addition, the causes of fire that we do not know are so numerous that it is not difficult to find, in fact, an acceptable cause for nearly all our fires. Of course it is not possible and, in fact, why should it be necessary to find the particular cause of every particular fire when we know of so many causes that could readily be responsible for it. As a matter of fact, if we would care to take care of the common every day causes the number and extent of our fires would be so largely reduced that the remaining unaccounted for causes could be treated as a negligible quantity. It is in the causes of fire and their removal or safeguarding that the fire expert performs his most tangible and self evident service. He can examine a building and point out very definitely conditions that

mean the starting of fire sooner or later and he can follow up this fire diagnosis by prescribing a course of treatment.

The standards so far described have dealt with the construction of the building, the machinery or processes of operation and the use of appliances or systems. These would suffice if our building was uninhabited, but as it is to contain people to a greater or less extent, there is presented the human factor.

The Human Factor.

Fire is an uncertain thing and it produces excitement and fear. The presence of smoke sets people into a panic even if there is no real danger from the heat and the flames. It is not only girls and women that lose their heads when fire occurs, but men and even trained firemen are not proof against panic. Anyone who has ever experienced or witnessed a fire scare is ready to testify to the value and necessity of a prearranged system of procedure and the adoption of fixed rules of action, so that when fire occurs things go forward in an orderly and systematic manner.

The method of handling a fire emergency is sometimes called a fire drill and this indeed is stated to be the fifth standard of safety. A fire drill as installed in school buildings and many other places is usually only a system of marching and seldom meets the full requirements of the situation. The fire drill to fulfill its purpose should provide for all the accidents and contingencies that are part of a fire. In its plan, it should include provision for sounding a warning or signal to all persons in the building. It should provide for the forming of the people into ranks and the marching of the ranks under leadership to the exits. It should provide for sufficient safe exits to discharge the people within a safe period of time. It should assign to competent persons the duty of using the fire appliances, both in extinguishing or checking the fire and in notifying the fire department and co-operating with the firemen when they arrive. In brief, it should assign to every person in the building a fixed duty and leave nothing to chance or haphazard.

It follows from this statement of the purpose and function of a fire drill that it should be installed by a fire expert because it is only the expert who can anticipate the starting of fire, provide for the usual conditions that are bound to arise and indicate its probable extension. It is positively an increase of danger to have so-called fire drills, which are merely a system of marching people out of the building, because such drills are parades rather than practice in discharging people from a building on fire. There was a pathetic demonstration of this fact at the school fire in Collinwood, Ohio, in 1908 when 163 children were led down a stairway into an open hallway where the fire leaped upon them. The fire drill worked perfectly as far as the marching of the pupils went, but the person who planned this drill had no conception of the fire dangers of this particular school building and therefore did not realize the terrible mistake of having the children use a stairway that was open to the flames and smoke.

Regular Inspection.

The last standard of safety is regular inspection. It is a matter of common experience in all branches of human activity that a well designed and well built machine is of reduced value, if provision is not made for keeping it in effective working order. The principle of maintenance is just as necessary in dealing with the problem of fire as it is with anything else. Eternal vigilance is the price of safety as well as liberty and a factory as well as any other building that is to be made safe and continued in that desirable state must be carefully looked after.

The inspection to be thoroughly effective should be both self inspection and superinspection. The owner of a building, and the employer of labor, should be sufficiently informed about the fundamental requirements of safety to be able to personally assure themselves that they are being observed. The actual work of examining the fire appliances and the precaution and safeguards may be delegated to an agent or a subordinate, provided some degree of personal supervision is exercised. This can be done by the use of a detail fire inspection report or blank, which covers questions and answers on the practical examination and tests made by the subordinate.

Self inspection is valuable and necessary as a proof that the occupants of the building are themselves concerned about the fire danger and are personally taking some steps to provide for their own safety. It is human nature, however, to relax care and vigilance through constant familiarity. For this reason it has been found as a matter of experience that superinspection by an outside and disinterested agency is essential. The superinspector as he might be termed, visits the building at unexpected times; he comes to the building with his perceptions fresh and keen, so that he is in a position to notice defects and errors that are overlooked by persons in daily contact with the conditions.

EMPLOYERS WHO DEMORALIZE SYSTEM.

Many business men are so constituted that they are constantly doing things in their places of business which utterly demoralize discipline and make system impossible.

I know an excellent man, who, instead of giving orders to heads of departments, goes directly to subordinates. If, for instance, he wants to learn anything about a department he will send for a clerk or a bookkeeper, instead of for the superintendent. In this way he keeps his entire business force constantly in hot water.

He has able lieutenants around him, but will never give them that untrammeled authority or freedom which develops individuality and originality, and calls out their resources. He is all the time checkmating their movements, criticizing their actions and tearing their work to pieces, which causes them to lose heart.

A superintendent or department head so treated will say: "What is the use? If I attempt to do anything original my plans will never go into effect. Everything is stopped, criticized, 'blue penciled' and changed."

The way to bring the best out of a man is to invest him with proper authority, give him liberty of action, hold him strictly responsible for results and be generous enough to encourage and praise him when he does well.

No one can do his best when he is always being scolded and nagged. Many well-meaning men criticize, not for the purpose of hurting one's feelings or injuring him, but because of their mental habits of inexactitude, and there is an instinctive protest in their natures against careless, indifferent, slipshod work. They want everything done just right, and when things go wrong, they are upset. They do not know how to remedy what is wrong, to get proper results without criticizing or finding fault.

But fault-finding never did and never will get the best results from employees. The best thing in people can not be forced out; it must be drawn out by kindness, appreciation, encouragement. Attraction is more effective than force.—Success Magazine, April, 1911.

REVIEW OF "REPORT ON THE CONDITION OF WOMEN AND CHILD WAGE EARNERS IN UNITED STATES"

VOLUME 2: "MEN'S READY-MADE CLOTHING"

L. H. Brittin

From the viewpoint of industrial organization the men's ready-to-wear clothing industry is in that period of transition between the small shop organization and the manufacturing system of the large establishment.

This industry, like all industries in its period of transition, is marked by extremes existing side by side which give the clothing industry a heterogeneous appearance to the outside investigator.

The Government report under consideration cites many instances of poor organization, inadequate system of wages, poor ventilation, poor sanitary condition, and general inadequacy as compared with modern standards in the small shops employing from one hundred to two hundred people.

But this same report cites instances of strong factory organization, improved system of wage-payments, modern ventilation, modern sanitary conditions, wash-rooms, dressing-rooms, lunch-rooms, constantly improving phases of welfare work in a few of the larger manufacturing plants.

In a word, the men's ready-made clothing industry is marked by extremes, which the writer believes is due largely to the period of re-organization through which it is now passing.

In reading this Government report in the light of these explanations, much of the subject-matter describing unsatisfactory conditions as compared with those of other industries, is indicative of conditions changing for the better in accordance with the re-organization of this industry.

This report, which is Volume 2, of nineteen volumes being issued by the Commissioner of Labor, through the Government printing-office at Washington, dated 1911, contains a mass of authoritative statistical information concerning the men's ready-made clothing industry.

It deserves a place in the reference library of every student of industrial development, but unfortunately it is published in the usual form of Government reports, in pamphlet form of 878 pages, and we recommend that it be rebound securely in two volumes; the first containing Chapters 1 to 9, or 57½ per cent of the subject-matter, and the second containing Chapter 10, devoted exclusively to tables and containing the remaining 42½ per cent.

The 878 pages of this report are divided approximately as follows:

Introduction		2 %
Chapter 1	Labor Force	4.5%
Chapter 2	Employment of Children	3.5%
Chapter 3	Hours of Labor and Overtime	1.5%
Chapter 4	Earnings of Employees	11 %
Chapter 5	Home Work	12.5%
Chapter 6	Clothing Shop, Working Conditions	3.5%
Chapter 7	Family Conditions and Income	7.5%
Chapter 8	Organization of Clothing Industry	8 %
Chapter 9	Development of Clothing Industry	3.5%
Chapter 10	General Tables	42.5%
		100%

The investigation of the Bureau of Labor into the employment of women and children in the men's clothing industry was carried on in the five cities of New York, Chicago, Baltimore, Philadelphia, and Rochester, covering 244 factories, with a total labor force of 23,683 wage-earners. Of these establishments 83 were in New York, 70 in Chicago, 22 in Baltimore, 39 in Philadelphia, and 25 in Rochester. These establishments were selected for the purpose of gaining information representative of the industry in each locality, including some showing the best conditions, some where average conditions prevail, and some showing the worst.

Furthermore, this investigation concerned itself only with employees of shops in which the garments were actually made up, disregarding employees in cutting-rooms and commercial departments, which under existing conditions in the clothing trade, come under a different class of organization.

According to the census of 1905, there are 2,844 establishments listed in the men's ready-made clothing industry, this investigation covering 244 or 8.6 per cent of the total. In this same census there were listed 79,805 wage-earners, 23,683 of whom, or 29.7 per cent of the total, were covered in the investigation.

Working Conditions.

In considering the subject-matter of the report, perhaps that part covered by Chapter 6, entitled "The Clothing Shop and Working Conditions," comprising in matter 3½ per cent of the whole, will be of the greatest interest to the readers of "Human Engineering."

The chapter is divided into the following headings: Ventilation of work-rooms, fire escapes and fire protection in buildings in which clothing shops are located, elevators, wash-rooms, dressing-rooms, water-closets, lunch-rooms, and welfare work.

In regard to ventilation of work-rooms (page 321), it was found in the course of the investigation that 205 establishments, employing nearly 17,000 or approximately 75 per cent of the total number of shop-employees, relied for ventilation wholly upon doors and windows, the prevailing tendency in cold weather being to keep all windows and doors closed during working-hours. Only 20 per cent of the total number of establishments visited ventilated the work-rooms during the day. The condition indicated by these facts gains in significance on account of the large number of establishments whose work-room atmosphere is shown to be perceptibly affected by poorly equipped, badly located, and ill-kept toilets.

Under fire-escapes and fire protection in buildings in which clothing shops are located (page 322), the investigation states that the laws of New York, Illinois, Maryland, and Pennsylvania, require fire escapes to be placed on all buildings used for manufacturing purposes, if above a specified height. In New York, Illinois, and Pennsylvania, this applies to buildings three or more stories in height, and in Maryland to all buildings where manufacturing is carried on above the first floor.

It was found that all clothing factories investigated in buildings of more than two stories were provided with fire escapes. The type of fire escape most commonly provided (page 324), consisted in balconies on each floor constructed of iron, with light iron steps leading from balcony to balcony. In many cases the steps provided were old and of doubtful strength. In some cases it was found that access to such fire escapes was blocked or that the termination of such fire escapes was of such a character as to render it dangerous for use. In general, no great attention was paid to the location of

either buckets or extinguishers (page 326), except in some of the larger establishments, which generally pay greater attention to fire protection. Also it was generally found that the adequacy of exit varied with the size and character of the establishment. Those shops in which the best means of exit were found were generally in buildings occupied by the larger manufacturing concerns, and conversely the worst exits were found in buildings occupied by small contract shops, located in the tenant factory buildings. Both of these statements, however, are subject to exception.

In regard to elevators (page 327), it was found that many of the establishments investigated were located on upper floors of high buildings, where the climbing of many flights of stairs in going and returning from work was a matter of hardship, especially for women. In a great majority of cases the elevator was merely the usual type of freight elevator, a platform with (sometimes) two sides built up, but practically unguarded so far as the passenger is concerned (page 328). Some of these elevators are not constantly attended but are used by anyone from any floor. The following dangerous method is generally employed. A signal is usually given and if no objection is made from any other floor the elevator is started by the person wishing to use it. Gates or automatic doors, however, are usually found at each floor to provide against the danger of falling into the elevator shaft.

A noticeable provision for the comfort of employees in regard to the use of elevators was seen in the case of one establishment, employing over one thousand people on the sixth, seventh, and eighth floors of a high building (page 329). This firm has installed five elevators for the use of its employees; in order to utilize these cars to the greatest extent the employees on the various floors begin and cease work at five minute intervals. At the time of issuing this report, there is no law in New York, Illinois, Pennsylvania or Maryland, making compulsory the installation of elevators for the use of employees.

Under the heading of wash-rooms (page 329), and by this is meant a space partitioned off containing adequate lavatory and toilet facilities, in such a manner as to ensure necessary privacy, the report says that separate wash-rooms for male and for female employees are required by law in New York and Pennsylvania, but that Illinois and Maryland at the time of this investigation, had no such legal provision. In most of the cities covered by the investigation, a wash-room was the exception, while a faucet and sink, usually in a small wash-room, was the rule (page 330). As might be expected, it was in the larger establishments that the best conditions, i. e. wash-rooms for each sex, were found. In New York the average number of employees in establishments providing wash-rooms was 174, while in all other establishments the average number was 88. In Rochester the average number was 244 to 83, and in Philadelphia 239 to 37.

However, one establishment had installed in addition to the usual facilities, a shower-bath for men on each floor (page 331). This shower-bath had a capacity of four men at one time; Turkish towels were furnished, and the establishment reported that the shower-bath scheme was growing in popularity. This case stands out strongly in contrast with the sink and faucet, which, as has been said before, is the usual arrangement.

On the subject of dressing-rooms (page 331) the investigation says that the necessity of providing dressing-rooms in clothing establishments is not as great as in many lines of industry, where the nature of the industry compels the use of special clothes to work in. Nevertheless, it is the custom in some of the better class of establishments for female employees to change their outer garments for working garments before going to work. Such change of garments

may fairly be regarded as essential to a reasonable degree of comfort if not of economy. Many dressing-rooms were found to consist merely of space in work-rooms screened or partitioned off to a height of six or seven feet, with a shelf around the inside for hats and bundles, and with hooks for hanging clothes. Even this class of room is better than another kind commonly found, which consists of similar space partitioned off from the main work-room by walls of thin cloth or frequently by heavy wrapping paper (page 332). In some establishments, however, much better conditions are found. A Rochester establishment is reported as having a dressing-room partitioned off, provided with good light and ventilation, and equipped with racks, hooks, and mirrors. Everything was painted in white enamel and kept scrupulously clean, giving on the whole an attractive appearance.

A Baltimore concern had provided not only a dressing-room for its female employees, but also ventilated steel lockers, with keys, for each employee. But as in all other items of improvement, dressing-rooms and other conveniences for employees are found in the main in the large concerns, the poorest conditions in all respects, on the other hand, are generally found in the shops of the small contractors.

Considering the matter of water-closets (page 333), the report suggests the following requirement for manufacturing plants as follows:

1. Adequate facilities for working force; 2, conveniently placed; 3, separate for sexes; 4, hygienically located; 5, having sufficient privacy of approach. Here again, the most satisfactory conditions were found in the larger establishments, and the most unsatisfactory in contract shops and small manufacturing concerns.

In regard to lunch-rooms (page 336), so many of the clothing shops are small, that few provide lunch-rooms for their employees. It is a very common sight to see a long row of sewing machine operators, seated before their long work-benches, containing their sewing machines; the tops of this tabling being littered with bits of cloth, thread and food.

If the worker is paid on a piece-work basis, he or she frequently eats lunch while at work. This is true not only of the operators, but also of the other employees connected with the machine work, and as the shops are often dirty, the ventilation usually poor, and in hot weather the heat is excessive, the work-rooms are not attractive places in which to eat, or to work in, for that matter.

Six establishments out of 244 visited, in the five cities (New York, Chicago, Baltimore, Philadelphia, and Rochester) have provided lunch-rooms for their employees.

The lunch-room provided by a Rochester firm is worthy of description. A room is partitioned off from the work-room on the ground floor. A complete kitchen equipment has been installed, including gas range, coffee urns, cooking utensils, etc. Tables have a seating capacity of 120 people (working force given at 586) and are covered with clean white table cloths and are provided with silver knives, forks, and spoons. The owners of the establishment, together with the foremen and other heads of departments usually eat here with the employees. The management of the lunch-room is in the hands of one of the office force. Good plain food, well-cooked and nicely served is furnished. Milk is served in bottles as it is shipped, and the whole is most satisfactorily managed. A sample menu follows; being evidence of the firm's purpose "to present a substantial nourishing meal at a nominal cost." The menu is changed daily:

Bean soup	5c
Cream codfish	5c
Corned beef hash	5c
Corned beef sandwich	5c
Lyonnaise or boiled potatoes	3c
Creamed rice pudding	5c
Oranges	3c
Doughnuts, fried cakes, and cookies	1c
Tea, coffee, and milk	3c

The method of service here is similar to that of the cafetières in Chicago: Each one takes a tin tray and passes in front of the serving counter where the order is placed on the tray. He then carries it to one of the tables. The employees also have the use of this room for the purposes of eating their lunches brought from home. About 10 per cent of the employees patronize the lunch-room in summer, and about 20 per cent in winter.

On the other hand, the food peddler and the small restaurant in buildings where the small shops occupy part or all of one floor, are peculiar to the New York clothing trade. The peddler offers to the occupants of such shops, candies, cookies, cakes and various kinds of fruits, slices of watermelon, selzer water, and numerous small wares, such as buttons, matches, thread, etc. At other places they make regular visits throughout the buildings at various hours of the day, as there is no particular hour for meal-time for the majority of these workers. It is found that those who eat their lunches in the shops, do so to a large extent in the actual work-rooms; also that the difference between the summer and winter use of these work-rooms as eating-places is so slight as to be practically negligible.

Although the periods allowed for noon-day meal are reported as thirty, forty-five, and sixty minutes, with comparatively few exceptions many of the employees take much less time than is allowed them. As to the employees who go home for lunch, it is found that they hurry back for the purpose of starting work as soon as possible.

With piece-work more prevalent than time-work (sometimes as high as 90 per cent) the employees themselves see to it that as little time as possible is lost in eating their lunches.

This practice is not a violation of the law, where a law exists, but does tend to the promoting of violations by the employer, for it is the opinion of the report that as long as the piece-work system exists, the employees in the clothing industry will work as many hours as they may, and if by taking no time from work to eat a meal they can make a little more money, they on their part will not demand that time for eating be allowed them, nor will they interfere with the employer's evasion of the law.

For the interest of the readers of these pages the reviewer wishes to say in this connection that in one factory, not covered by the investigation, because it is not located in one of the largest clothing centers of the country, conditions of this kind were obviated by fitting up an adequate lunch-room in the basement of the building and inducing all of its employees to use this lunch-room for the purpose of eating their lunches. Not only were they required to leave the work-room on the sound of the whistle, but were not allowed to return until five minutes before starting the afternoon's work. During the intervening period of twenty-five minutes, all windows were open and the work-room was thoroughly ventilated. The employees were further induced to leave the basement lunch-room after finishing the meal and get into the bright sunlight outdoors for the time intervening until the sound of the whistle.

This system had been in use only a short time when its success was apparent, and at present no employee would go back to the old system.

The reviewer believes that a certain amount of factory discipline is the basis of all effective welfare work, as it is by this discipline that many features of welfare work are made possible. The emptying of the work-rooms every noon for lunch showed the need of a systematic fire-drill and the basis of that fire-drill was laid when the management through the strength of its line organization developed a system of marching its employees down to lunch every noon as well as out of the building every night. In this way, when the fire-drill was established, it was accomplished for the one thousand people in approximately two minutes.

Environment is a potent factor in the organization of a manufacturing plant, and the men's ready-made clothing industry has arrived at the point where a concerted effort is being made to improve the working environment of the employees, and simultaneously increase the all-around efficiency of the working force, improve the product and generally develop the business through the development of proper working conditions. This may be broadly called service or welfare work as a system of management, compared with welfare work as it is too often carried on wholly separated from the manufacturing end of the business.

Under the heading of welfare work this report says (page 343) that very little is done in the direction of what is usually termed welfare work, among the clothing factories investigated. In contract shops no such efforts were found, and only a few of the larger manufacturing concerns made any attempts at it. The report further says that "the better sanitary, heating, lighting, and other conditions of construction, which were found in the larger establishments, cannot, of course, be classed as welfare work." There are, however, a few cases where organized effort was made to better the conditions of employees outside of those matters.

In only four establishments investigated (out of 244 establishments in five cities, including 23,683 persons) mutual benefit societies had been organized among the employees, aided more or less by the firm in question. There were five societies in all, two of which were in different factories of one firm. All of these, however, were found in large establishments (for description, see pages 343, 344, 345).

A savings-bank was also established in one firm (see page 345). The scheme was originally intended as an encouragement to saving for Christmas time, but the savings need not be for that purpose. All funds were deposited with the firm, and six per cent paid on them. Employees have the privilege of withdrawing their accounts from the bank at any time, and furthermore may borrow upon the endorsement of another depositor, up to the amount of the endorser's deposit. Just before Christmas of 1907, something over $5,500 was withdrawn from the bank.

A Few Facts on the Industry.

Concerning the clothing industry generally, a few facts may be of interest to the reader of these pages.

In this country the manufacture of men's ready-made clothing ranks as follows:

Seventh in gross value of product.
Seventh in number of wage earners employed.
Eighth in amount expended for wages.
Twelfth in net value of product.

In condition of women and children the industry is of special interest.

In the number of women employed it is second only to the cotton industry.

As a field for child work it is ninth among the industries of the country.

Men's ready-made clothing is the largest single branch of the sewing trades.

As a factory industry it represents the most difficult work in the sewing trades.

It is the most important part of the clothing industry.

The annual value of the ready-made product is about twice that of the custom-made.

The industry is characterized by extreme concentration.

It is confined to the cities.

In 1905, 68.3 of the total product was made in the five cities of New York, Chicago, Baltimore, Philadelphia, and Rochester.

Also, 11 per cent in the five cities of Cincinnati, Boston, St. Louis, Milwaukee and Louisville.

Thus, 79.3 per cent or four-fifths of the total product is manufactured in the above mentioned ten cities.

Fifty per cent of the total product is manufactured by the Atlantic Sea Board group (New York, Philadelphia, Baltimore—New York manufacturing 38.5 per cent of the entire output of the industry).

In the Central West, Chicago, Cincinnati and St. Louis are in the lead.

The urban localization of the clothing industry is due to the dependence of the industry on labor.

The manufacture of clothing does not require a large amount of capital invested in plant or costly machinery; it requires comparatively little space, which makes it possible to locate in cities in spite of high rent or high value of real estate.

The largest cities are in the general way the largest clothing centers.

The massing of the industry along the seaboard is further explained by the facility for obtaining large additions to the laboring force.

New York and Chicago are the largest markets in the country, they are also the largest clothing centers.

Herewith follows a few facts taken from Chapter 1 entitled the Labor Force:

Male employees over 16 years of age.....	46.8%	
Female employees over 16 years of age.....		49.6%
Male employees under 16 years of age.....	.7%	
Female employees under 16 years of age.....		2.9%

Everywhere the force is predominately of foreign origin and for most part of foreign birth. This is true for both males and females.

In this respect the working force divides itself as follows:

American born	12%
Native born of foreign parents.....	53.4%
Foreign born	32.3%
Not reported	2.3%

The nationalities among the working force divide themselves as follows: Italian, 28.8 per cent; Hebrew, 28.3 per cent; German, 11.4 per cent; Polish, 7.9 per cent; Bohemian, 7.3 per cent; American, 5.4 per cent; Lithuanian, 3 per cent; Scandinavian, 2.5 per cent; and other races, 3.5 per cent.

Note the predominance of the so-called newer immigrants, Hebrew, Italian, and Slavic.

Note the greatest diversity of races being found in Chicago.

The Italians are the newest immigrants particularly in New York.

In conclusion it is well to notice the ratio composition of the force on the organization of the shops, and on the workers. It results in a tendency to organize shops along the lines of one race, particularly is this true in the smaller shops and contract shops, where often every employee is of the same race. Even in the larger factories there is a tendency for the employees to be recruited from the same race as the foreman. The only broad exception to this statement results from the employment of Italian women in New York and Philadelphia. These take the place of women of other nationalities even where the men are of one stock.

There is specialization in the kind of garment made along the lines of race. Thus the Bohemians of Chicago are found chiefly in coat shops, the Poles in pants shops, the Scandinavians in vest shops.

The predominant foreign character of the employees, the necessity of employing foremen of the same race, means a retention of foreign speech in the shop. This is one bar to the acquisition of English and to assimilation.

The shop organization along the lines of nationality retard the assimilation among the immigrants themselves and with the general community.

Because of these facts, together with the custom of the races to occupy separate districts, the shop, particularly the small contract shop, located in foreign quarters, helps to keep them apart from the rest of the community. It is brought out in this report the fact that compared with industries in general, women are employed with much older men. To the extent that they are in competitive occupations, the women in this industry are handicapped by their lack of experience due to their brief continuance in the trade.

At twenty-five years and over the importance of the women employees rapidly diminishes. It appears from the studies of the details that the female labor force as a whole is made up of single women, for the most part single women under twenty-five years of age.

The study of these figures and of those relating to the number of married and single women at each age shows how brief is the working life of the women in the clothing industry.

The female labor force in the clothing shops is in a steady or constant change, a large part of the force leaving work each year.

A considerable proportion drop out at 19, and by 22 over half have left, by 24 three-fourths have dropped out. The working life of these women would thus range from three to nine years. (This is a most important condition and must be considered in detail in connection with an installation of any mutual benefit society, pension plans, or any other form of establishment funds.)

The workers do not have the same opportunities for learning the more complicated processes and becoming expert in them.

This probably accounts for the fact that in the eastern cities, where plenty of male laborers are available males are used for practically everything except the least skilled work. Naturally the women are handicapped in competition with the men for the same kinds of work. It is needless to say that their earnings are affected by their inferior skill and their attitude toward work is a temporary make-shift. Taken together with the immigrant character of the force, the age composition helps explain why it is that labor organization has made so little progress among the women employed in the clothing industry.

OCCUPATIONAL DISEASES.*

ALICE HAMILTON, M. D.

The title of my paper really should be "A Neglected Branch of Medical and Social Science," for I believe you will all agree with me when I say that there is no one subject at the present day which has been so generally neglected by American sociologists and physicians as the subject of occupational diseases. It is not because it is new, for it is centuries old. I think it was Pliny who first spoke of the diseases of slaves, meaning by that phrase, lead poisoning, mercurial poisoning, and the consumption of potters and weavers. The study of industrial diseases sank into oblivion after Pliny's time, as did all medical studies; but it was revived with the revival of medical science and has kept pace with it. There is now in Europe a comprehensive literature on the subject, a literature which is partly medical and partly sociological, and the two aspects of the subject are shown in the name which is now given to it: industrial hygiene. Only in our country does one find an almost complete silence on the subject.

And it is not because we have no industrial diseases. There is a very general idea in this country—I am always being confronted with it—that conditions here are immeasurably better than in the older countries; our methods superior; our working people stronger, but we have no facts to support this vague impression. Indeed, we have no facts at all to speak of. There is the greatest contrast between the attitude of the general American public on this question and that of, for instance, the English public. Take the pottery industry. Every intelligent English person seems to know that there is lead poisoning in the potteries and where the potteries are, and how important an industry it is, and, just as a conscientious American woman will tell you that she buys Consumer's League underclothing and follows the Audubon Society in the matter of plumes, so a conscientious English woman will say that she always insists on a leadless glaze when she buys pottery. Now, there are great numbers of potteries in Ohio and New Jersey. One little Ohio town has no less than twenty-two; and the white lead manufacturers tell me that they sell carloads of white lead to these potteries. But I cannot find that the people of Ohio and New Jersey know anyhing about the industry; certainly they are quite bewildered when one asks them about lead glazes and whether pottery making is unhealthy. Nobody has ever explored these isolated places, which are apparently in our midst, but which actually might be down in Mexico for all we know about them.

I have puzzled a good deal over this curious blind spot of ours and I can find only one explanation of it; and that not altogether satisfactory. In England, and to a certain extent in Germany, the work people are of the same nationality as their employers; and they usually form a stable part of the community. Here, in the poisonous and dusty trades at least, they are largely foreigners and form a floating, migratory population. I was impressed by an instance of this a few months ago when I was driving to Dixon, a charming Illinois town on the Rock River. Outside the town is a Portland cement works; and it was easy to see from the walls and windows that it was as frightfully dusty as such factories usually are. I said to my driver that I could not imagine how people in prosperous Dixon could be induced to work in a place like that and run the risk of ruining their health. "No Dixon people work there," he said. "You could not get white people to do that work, for it eats out their lungs. The help is all Polack or Dago, and they live up in those shanties." And there on the hillside above the works was a typical,

*Read at the Conference of Charities and Corrections, June, 1911

isolated industrial colony of Polish and Italian nomads, temporarily housed in ramshackle, wooden shanties, working at a trade that the so-called white people of Dixon were too wise to touch, and probably sickening here and there from the dust, and departing, those who could, to the old country in search of health again; those who could not, to easier, sedentary trades—such as home finishing, the general refuge of the tuberculous. And always a stream of still more recent immigrants coming in to take their places. But, I doubt if the people of Dixon know that there is pneumonia and tuberculosis on the hillside so near them; certainly, they do not know it as they would if the sufferers were of their own town, had gone to school with them, belonged to the same church or the same lodge.

This gulf between the non-English-speaking immigrant workman and the American community of which he is nominally a part can be seen at its widest in certain southern Illinois towns, where there are great lead smelters. I do not believe that in any country the distance between peasant and noble is greater than is the distance between this army of homeless Greeks and Slavs housed in the company shacks of the smelting works, and the American citizen householder of the little town barely a mile away. The only connecting link between the squalid sheds and the prosperous homes is a long line of saloons with foreign names over the doors. Perhaps this isolation of the industrial worker is not the only reason for our ignorance about the diseases of industry but certainly it is one reason.

A year ago this March the Illinois Commission on Occupational Diseases began a study of the question in Illinois. It was a good commission, with Professor C. R. Henderson as its secretary and a pathologist and a chemist of national reputation among its members. The commission had an ample appropriation and very wisely decided to spend as little as possible for accessories and to devote the greater part of the money to the paying of investigators. The question of selecting the field of study came first, and, as we discussed it, we seemed to be looking out over a vast almost unexplored country with here and there a tiny outpost of civilization showing where some hardy pioneer had ventured out and reclaimed a little of the wilderness. The largest of these outposts was, of course, Dr. Andrew's study of phosphorous poisoning and we envied him for having appropriated the one industrial poison which is used in but a single trade and which causes an absolutely characteristic form of disease. There were certain other isolated studies, chiefly of some of the dusty trades, and a few of the excessively damp trades, but none of them in Illinois—there the outlook was unbroken.

The dusty trades are undeniably the most important disease producers because so vast an army of men and women are engaged in dusty work of various kinds, and we decided not to choose them. It is not easy to prove the causal relation between respiratory disease and any particular trade, because other disease-producing factors enter in, such as poor housing, family infection, insufficient food, alcoholism and over fatigue. In the poisonous trades, on the other hand, the connection between disease and occupation can be more clearly proven. Sometimes, as in the case of phosphorous, lead, arsenic, mercury, the symptoms of poisoning are characteristic and indubitable. So we chose the poisonous trades beginning with lead, and going on to brass, zinc, carbon monoxide, turpentine, naphtha and benzine, varnish removers, hydro fluoric acid, nitrate of silver, the chromates, the cyanides. Mrs. Kelly has asked me to give a sketch of the experience of the Illinois Commission because it is probably such as will be undergone by any group of people who undertake to study the industrial poisons in any of the States.

When I began on the lead trades, a year ago last March, the Commission gave me a perfectly free hand and told me to employ all the help I needed; but while I had a fair knowledge from books of the lead trades in Great Britain and on the Continent, I was absolutely ignorant as to the lead trades in Illinois and for more than six weeks I could not employ an assistant because I did not know enough to be able to instruct anyone. In the first place, nobody knew what were lead trades in Illinois beyond a few well known ones, such as white lead, lead smelting, painting and printing. The factory inspectors could not tell us for there is no chemist connected with the department and they do not know what substances are handled in the different trades. Foreign authorities were of some assistance, of course, but several trades which are notorious sources of lead poisoning over there, proved not to be so in Illinois, such as file making, making cheap tinware for kitchen use, making glass, pottery and enamels and India rubber. File making by hand seems unknown in Illinois. Our cheap tinware is, unless all my informants are liars, quite free from lead. Illinois glass is not lead glass; and almost all of her pottery and enamel is lead free, while the comparatively harmless lead sulphate has taken the place of white lead in Illinois rubber works.

This sounds simple enough, but I must confess that I spent the larger part of three months verifying these few points and I consulted thirteen commercial chemists before I succeeded in finding out the constituents of the pottery glazes used in Illinois, and almost as many before I got the rubber question settled. Information from workmen was valuable only in the skilled and original trades; the unskilled workman has little idea what he is handling. For instance: a newly arrived Roumanian Jew went to work in a storage pottery works and was severely poisoned after thirteen days, because he had no idea that the red lead paste he used was poisonous, and he habitually wet his fingers in his mouth as he worked.

From the unions we got valuable information as to the effect of different varnish removers, turpentine substitutes, cyanides and chromates, and as to the most dangerous parts of the painters' and printers' trades.

From the employers, one may get trustworthy information and one may get information that is false. On the whole, it is better not to approach an employer until one knows all about his trade. Then he will often give one valuable information as to other trades.

No method of investigation can be adopted. One must simply grope and catch at anything which offers the least help. All sorts of hints came to us accidentally. A manufacturer of patent covers for milk bottles put us on the track of car seals which proved to be a rather large industry, attended with lead poisoning. The electrical workers' union set us to studying lead poisoning among the layers of electric cables underground. In one way or another we found about seventy industrial processes which are productive of lead poisoning in Illinois; and we inspected the hygienic condition of 304 establishments in which lead is handled.

Then came the problem of ascertaining the morbidity rate of these trades and that is a problem on which foreign authorities could shed no light. It is all so beautifully simple over there. In England, one can ask to see the records of the Home Office and there one finds recorded every case of lead poisoning which has come under the care of a physician; and one can trust the record, for a government expert has verified the diagnosis. In Germany one can go through the workmen's statistics of its sickness insurance. In Illinois one must simply grope again and one must carefully check up and control every bit of information one gets.

Union sick benefit records are valuable, but most of the lead trades are unorganized; and the insurance companies, commercial and non-commercial, have almost no available information, although Dr. Frederick Hoffman of the Prudential Company, is the individual who has given us more general information than any other.

We were driven to hospital and dispensary records and the greater number of the 578 cases of lead poisoning on our lists came from these sources. But we have no idea how near the truth this figure comes. In Germany, they estimate that one sick workingman in four goes to a hospital and so they multiply by four the number of lead poisoned painters or printers or storage battery workers found on the hospital books and take the result as the actual number poisoned. But who knows what proportion of our working people go to hospitals. I wish there were any way of finding out.

The hospital records threw light on a number of trades which we know but little about, such as litho-transfer work, zinc smelting, polishing coffin handles, manufacturing wall paper, making leaden picture frames, finishing cut glass with putty powder. And yet those records were a source of great irritation for they might have been so much more valuable than they were.

There are two serious criticisms to be made of hospital records and history sheets: One is the superficial diagnosis. At the Brussels Congress on Industrial Hygiene last Fall, a Frenchman said that to most physicians lead poisoning always means colic or paralysis; and went on to say that it would be just as sensible for a physician to hold that alcoholism always means delirium tremens. Of course, many men die of alcoholism without ever having delirium tremens; and many men die of the effects of lead without ever having an attack of colic, or becoming paralyzed; and when one looks through a hospital admission book and notes the numbers of men engaged in lead trades who are entered as suffering from neuritis, lumbago, muscular pains, arterio-sclerosis, Bright's disease, apoplexy, gastro-enteritis, one cannot help believing that the doctors in charge were content to ascertain the actual condition present and did not care to look for its cause.

The second criticism has to do with the almost universal ignorance as to industrial processes and indifference to industrial hygiene on the part of physicians. In one city hospital, 92 cases of lead poisoning were treated between April 1910 and April 1911. In order to find out the trades responsible for poisoning those men, it was necessary to have a university student visit the homes of all but eight of them, for no statement as to occupation was made, except the single word "lead worker." In the records of the Cook County Hospital, "lead worker" may mean a man emptying white lead pots, or working in a smelter. "Electrical worker" may mean a maker of storage batteries or a man who lays electric cables. An "engraver" proved to be a mechanical artist working with white lead paint. A "novelty maker" was making lead picture frames. A "brass worker" was polishing brass and lead alloy, and a "labeler" which sounds like a harmless occupation, proved to be working in an atmosphere of white lead dust. These are only a few instances of that inaccuracy which more than doubled our work, making it necessary for us to follow up with great difficulty cases about whom the records should have told us all we needed to know, and, unfortunately, at least one-third of the cases can never be found.

I do not think I need say any more to convince you that if we wish to know of the harm done physically and economically by the poisonous trades we must begin at the bottom and slowly build up a system of record making. The first

step toward this would be, I believe, that which has just been taken in Illinois by the new law which requires the employer in the poisonous trades to engage a physician who shall examine at stated intervals all of the men exposed to the poison. This has already been tried in quite a number of factories and the results have been very illuminating, not only to the gatherers of statistics but to the employer himself, who is often amazingly ignorant of the condition of his men. The second logical step has also been taken in Illinois, namely, requiring physicians to report to the State Board of Health all cases of industrial poisoning.

I have spoken of the ignorance of many employers concerning industrial poisoning in their factories. Our experience with one factory is fairly typical of this and of the difficulties we encountered in making out our morbidity statistics. It was a place which employs regularly between 70 and 80 men and it was easy to see that there must be a good deal of lead poisoning among these men because of the lack of some of the simplest precautions against it, but absolutely no information as to this could be obtained on the premises. The workmen were Slavs and could not speak English. The superintendent, the foreman and the yard boss insisted that there was not a case of lead poisoning among the men and never had been; and they called upon a much startled Slavic workman to corroborate this statement, which he promptly did. This is the foreman's attitude in almost all instances; but it is usually not the attitude of the employer. As a usual thing, we found the man at the head not only approachable but very reasonable and often eager to receive suggestions. In this case, we went to the head of the factory; he was pleasantly incredulous; he knew his factory was beautifully clean (which was quite true); he remembered the time when the white lead industry was enormously more dangerous than it is now, and he simply would not believe that, with all the improvements he had instituted, there could be any lead poisoning among his men. Finally, he agreed to this bargain; if we could prove to him that there was lead poisoning in his factory, he would appoint a physician to make a regular weekly examination of all his men.

We found that it was no easy task to keep our part of the bargain. The factory was in the city and drew its workmen from all over the west and northwest sides. There was nothing to do but to visit Slavic and Greek physicians and to search the hospital records. From the physicians we heard that there was a great deal of lead poisoning in this factory and that they saw many cases in their practice; but general statements like that could not be used; and, unfortunately, few of them could remember individual cases. One Polish physician said he was sure he saw four or five new cases a month, but he could not remember specifically any but the last three, and, therefore, we could add to our list only three cases instead of fifty odd. We did finally collect a list of 18 recent cases for our employer and, later on in the Fall, 11 more. As a result of that there is now medical supervision of this factory and a very well equipped lavatory and lunch room for the men, and the same reforms are extending to the 10 additional factories in other cities over which this same employer has partial control. Once convinced, he showed himself entirely ready to correct the most crying evils, and this has been true of many other employers. Their willingness to do the right thing is only equalled by their fathomless ignorance that anything needs to be done. One of the most genuinely humane employers I know told me last June that he had no lead poisoning in his factory. I spoke to a negro outside and asked him if he had ever had the colic. "Four times," he said, in the eleven months he had worked there. A friend of his had died of the lead just the week before, but

he had been at it for a year a half. "We all get it," he said, "if we stay long enough." Later on that employer also decided to have a doctor look over his men once a week and when some five months later I visited him again, he handed me the doctor's records, showing that one man in eight then employed was leaded and three out of five of those who had been in the factory as long as one year. This employer is now taking better care of his men than any manager I know in the lead trade. It is not always the owner's fault that he fails to discover when his men are poisoned. In looking over some hospital records I was struck with one case of lead poisoning contracted in a well-known white lead plant. The man was an Irishman and was stated to have been married three times and to have seventeen living children. The next day I was in this factory and the manager was describing to me, as managers always do, the men who were in his employ many years and were in perfect health. He said, "I wish you could see one Irishman who has been with us for years. He's a big, husky fellow; he's been married three times and has seventeen living children, and he has never once been sick." Evidently that man had said nothing to his employers of his sojourn in the hospital.

Our study of the lead trades in Illinois convinced us that those authors and practical men who assure us that we have less lead poisoning than the older countries are very much mistaken. Let me give a few comparative figures, and please remember that while the English and German statistics are as accurate as possible, the figures I give you for American factories may be under the truth, but are never in excess of it. With all our efforts we cannot discover all the cases. In a Dusseldorf factory, employing 150 men, two cases of lead poisoning were discovered in 1910 by the examining physician. In an American factory employing 142 men, 25 cases were sent to the doctor in 1910 with lead poisoning. In an English white and red lead factory employing 90 men, there was not one case of lead poisoning in five successive years. In an American white and red lead lactory, employing 85 men, the doctor's records for six months showed 35 men leaded. Another English factory employs 182 men and did not have a case of lead poisoning last year. An American factory with 170 men had 60 poisoned during this same year.

These figures are startling but I did not select them with a view to making an impression; they are simply typical instances chosen because the number of men employed in the American factories nearly matched the number employed in the foreign factories. It may be said that the American figures are open to criticism because the white lead trade in this country employs a very shifting class of labor, so that a factory with a pay roll of less than 100 may actually employ from 200 to 500 men in the course of a year. It is an open question among the white lead men in this country whether or not this rapid change of workmen is an advantage. In some factories it is deliberately encouraged and the managers pride themselves on their humanitarian effort to protect their men against the severer forms of lead poisoning. Such factories make little effort to protect the men in any other way. On the other hand, those places in which the policy obtains of rendering the work as safe as possible make a point of retaining their help. Europeans have no doubt at all as to the relative dangers of these two systems. They claim that German and English statistics show that lead poisoning occurs in direct proportion to the number of casual workmen employed in any one factory. As about 20% of all men are unduly susceptible to lead and become poisoned in a very short time, from a week to a couple of months usually, a factory which is continually taking in new recruits will also continually send out poisoned men, while a fac-

tory which strives to keep its men, can weed out the over susceptible and settle down to a steady and fairly resistent force. It is also only with a steady force that one can ever obtain a proper standard of cleanliness and careful work. No foreman can be expected to show much solicitude for a gang of Poles or Italians whom he expects to lose after a week or two.

We cannot give any statistics as to other lead trades, but we are convinced that in lead smelting, the making of storage batteries, of paints and dry colors and in the printing trade, our country falls as far behind in the protection of workmen as it does in the white and red lead industry. Lead poisoning in the painter's trade is a matter of grave concern to all civilized governments except our own, and though no country has gained complete control of it, all are working toward that end. In France the movement against lead paint is almost a century old, and now in three years' time the use of such paint in France will be completely interdicted. No other country is as radical in this matter as France, but Belgium forbids the sale of ground white lead to any except a few accredited manufacturers of colors, and will not allow painters to sandpaper dry white-lead paint. Germany regulates the use of lead paints in many ways, and insists that the builder contractor shall provide for the use of his painters a warm, clean place with running water, soap and towels. If he can rent such a place, well and good, if not, he must build it. In neither Germany nor England do they use the process which is the most fruitful source of lead poisoning among our painters—the dry sandpapering of lead paint. They use a wet process. We find that twelve men were sent to hospitals with lead colic in Chicago in 1910, who had contracted the poison while sandpapering the white walls of the lavatories of Pullman cars. These little, closed in spaces would get full of the fine white lead dust as the men sanded the walls and ceilings, and it took only a few weeks for most of them to become leaded.

I do not wish to give the impression that the Illinois Commission studied the lead trades only. That was the part of the work which I had in charge and therefore I am more familiar with it, but the study of the brass trades and of carbon monoxide poisoning were no less interesting. Eighty-nine brass foundries were inspected and it was found that 63 were acknowledged centers of trade sickness, and seven more were apparently as bad, while of the remaining 19 only 4 were undoubtedly well enough equipped to prevent industrial disease. Brass workers suffer not only from the characteristic brass founder's ague, but also from the effects of lead, phosphorus, arsenic and antimony, all of which are present in the alloys handled. One hundred and eighty-seven men, representing 40 plants, were examined and 146 were found to be suffering from some ailment attributed to their work. The effect on longevity is seen in the fact that only 17 of 1760 men were over 50 years of age, only 180 over 40 years.

The inquiry into carbon monoxide poisoning was made at the great steel works of the Illinois Steel Company in South Chicago and Joliet, where thousands of workmen are exposed to this gas. It was very easy to obtain records of acute gas poisoning, but the investigators were more interested in discovering whether this acute poisoning, which much resembles that caused by ether or chloroform causes any permanent effect and whether there is a chronic carbon monoxide poisoning. The results of the investigation are given with caution and amount briefly to this: A careful physical examination of 240 workmen, who were frequently exposed to the gas, showed that very few men were in good physical condition but the physicians were uncertain how much of this to attribute to alcoholic excess, for 70% stated that they used alcohol to excess, and to unhygienic living and long hours of excessively hard work. One constant and suggestive feature presented

itself, namely, a decided loss in muscular power, which was shown by comparative tests made on these men and on workmen not exposed to gas. If this should be confirmed by further study, it means a large economic loss in those industries in which workmen are exposed to carbon monoxide. The investigators also noted that the majority of the men exhibited sluggish mentality, and recommend further study in this direction, for it is well known that long exposure to this gas has a profound effect on the nervous system.

To return again to the subject of lead poisoning. From the questions often asked of me, I have an impression that people in general do not know just how serious a matter lead poisoning is, although many charity workers undoubtedly are familiar enough with its effects. I might give some extracts from hospital history sheets and thus guard myself against the suspicion of exaggeration or sentimentality, for nothing can be more cold blooded than a hospital history. The cases are selected as typical of certain forms of lead poisoning.

One of the effects of long continued exposure to lead is premature old age, resulting from early hardening of the arteries.

J. S., Philadelphia, a colored man of 32 years, worked in lead for nine years. He came to the hospital with heart disease, hardening of the arteries and profound anaemia, the coloring matter in his blood reduced to one-third of normal and the red blood corpuscles to one-quarter.

F. S., Pittsburgh, Pa., a Hungarian 36 years old, came to the hospital with his third attack of lead poisoning. He had the usual pain, vomiting and headache. In addition he was pale and emaciated; he looked like an old man, was dull and apathetic, his muscles soft and wasted. His arteries were hard and he had a hemorrhage into the retina of one eye. He left the hospital hardly at all improved and three months later the Associated Charities, finding him still a physical wreck, decided to send him home to Hungary.

J. S., Philadelphia, an Irishman, 48 years old, who had worked in lead for five years, came to the hospital with violent colic and with paralysis of both hands and partial paralysis of the legs. He was unable to feed or dress himself and had difficulty in walking. He was sent to the almshouse, where he remained for almost three years, with little improvement; then another acute attack came on and he died at the age of 51.

Another over susceptible workman was J. M. of Philadelphia, an Irishman. He was a tall, powerful looking man of 47 years and up to this time had never been ill except in childhood. After eight weeks in the lead he had an attack of colic and then an increasing pain and loss of power in his arms and pain and weakness in his legs. After 4 months' treatment he left the hospital still pale and emaciated, with paralysis of both hands and difficulty in raising his feet.

One might multiply such instances indefinitely, but these four are enough to show you what lead poisoning means.

I have not said anything about the economic significance of industrial poisoning. It is this aspect of the case which has especially appealed to the Germans, and the importance in their eyes is easily estimated by the great mass of legislation they have passed in order to protect their workmen from the disabling effects of the poisonous trades. Whether we approach it from this side, or from the side of preventive medicine, or from that of pure humanitarianism, we must all acknowledge that it is a great and sadly neglected problem of our day.

STANDARD WORKING HOURS*

JOSEPHINE GOLDMARK, Publication Secretary, National Consumers' League

In the lives of working people, no single factor counts so much for good or ill as the length and regularity of their working hours. Even such important matters as wages, housing, insurance are subordinate. No reform, no betterment, is as important as the adjustment of work to human effort. All the possibilities of life, the worker's whole plane of existence rises and falls with his scale of time expenditure.

This sounds like exaggeration; but it is literal truth. Work any man or woman to the point of exhaustion and a higher or lower standard of living becomes a meaningless phrase. Offer what opportunities you will to the exhausted organism, they fall upon ears literally deafened, as science has demonstrated. Offer even heartier diet, ampler food, and it cannot be digested. It would be no more unreasonable to expect to cure an arsenic or phosphorus poisoned person by higher wages, a clean house, or old age insurance, while he continued daily to absorb the poison, than to expect to cure an exhausted worker by those means.

This is true because the exhausted person is literally and actually a poisoned person—poisoned by the body's waste products. Fatigue is not a philanthropic or sentimental fiction: it is a chemical fact. It is the signal which gives warning that the limit of capacity is approaching. Exhaustion follows when the signal is disregarded, and the organism is pushed to further forced exertions. For the half century, scientists have been studying the intricate problems of fatigue and learning its laws, in the seclusion of the laboratory. During the same period working people and their friends have been seeking against the most powerful opposition for legislation to protect from industrial over-fatigue and exhaustion. Between the two groups there has been an unbridged abyss. Those who have sought legislation year after year, so often in vain, have not even known that there were laws of fatigue, as a scientific and demonstrable basis for their claims. On the other hand, scientists and physicians have studied muscle and nerve, frog jerk and pigeon flight in infinite detail, without as yet applying the laws and facts so acquired to the phenomena of fatigue in the largest classes of our population, the wage earners.

A hundred years ago in England, efforts began to obtain legislative protection for the workers. After a century of human experience, it remains true that in our country the most helpless workers are the most exploited. Men are working twelve hours a day and seven days a week in Bethlehem and Pittsburg and other steel centres; women are being worked twelve and fourteen hours a day in laundries and box factories and many industries subject to seasonal pressure. In only ten states children are protected by an eight hour law. There are more cheering facts to be considered, but for examples of the most extreme overwork existing today among working men, let any one read the Government report on the steel industry in Bethlehem, reinforced by Fitch's "Steel workers." For the overwork of women, let any one read the Government reports on wage earning women and children, three volumes of which have appeared and six are yet to be published; or the special Government reports as on the telephone service and the work of women in Chicago just before the ten hour law went into effect.

So far as concerns women, we have every year the edifying spectacle of the powerful manufacturers' association or retail merchants' association at the State Capitols, using all their influence to defeat legislation sought in order to make impossible such overwork as the Government reports

*Read at the Conference of Charities and Corrections, June, 1911

describe. This very year in California, Colorado, Washington, Delaware, Illinois and almost every State where legislation to protect working women has been sought, the manufacturers' association has been actively and officially in the field, opposing any laws at all where none have hitherto existed, as in California and Missouri, opposing extension of the laws as in Illinois and New York, raising the well worn cry that industry will be ruined.

These powerful interests pursue a most short sighted policy, ignorant that economically as well as physically the long day defeats their own best interests and that output and productivity rise with the shorter working day. To counteract such influence we need to utilize all resources at our command. We need to make it plain that the limitation of working hours is based upon fundamental laws of physiology. The scientists have not yet devised the means of studying industrial fatigue in the workshop as they have perfected means of studying fatigue in the laboratory. The problem is far more difficult, complicated as it is, by the many psychological stimuli and motives which make up our daily life. Thus, for instance, an effort was made to study the fatigue of working girls by ordinary methods of laboratory investigation, and it was found that the interest of the experiments or the excitement of the approaching closing hour made the girls seem fresher and more vigorous at the close of a long day than at the beginning. What we need are not isolated studies with inappropriate methods of measurement, but comprehensive plans for consecutive studies of the new problems.

To gauge industrial fatigue and study the far-reaching effects of overwork among industrial workers is a large undertaking. It can never be carried out adequately by existing agencies. Even medical inspectors of factories (hitherto almost totally lacking in our labor departments, but undoubtedly soon to be added) are not equipped to do this work.

What we need are institutions like the newly founded Labor Clinic for Industrial Diseases in Milan, with its regular course of lectures and investigation both in laboratory and workshop. In its progress for 1910-11 the first subject for laboratory research was fatigue, and the resultant modifications of the organism. Is there any medical or scientific body in the United States engaged in such systematic study of industrial workers? There is none known to the writer.

No need is more urgent than to obtain accurate information as to the effects of occupations, as they exist today and under American conditions of labor. And this need of information about the effect of occupations is more important concerning working women, both because their morbidity or rate of sickness is higher than among working men, and because the absence of strong trade organizations among women makes them, more than men, dependent for protection on the laws.

These facts as to the health of the wage-earners are needed not only for the information of the legislators who frame the laws, but for the judges who must decide the constitutionality of the laws? And here we face a more cheering outlook.

In the last three years the attitude of the courts toward the legal protection of working girls and women has been greatly modified. Three years ago the prospects for shortening women's hours of labor looked dark. The eight hour day seemed in the remote future. Even the ten hour day was on sufferance.

The Supreme Court of Illinois had said, in 1895, that working women did not need and could not have legal protection from overwork. The

effect of that decision persisted for thirteen years, paralyzing action in all the States. In January, 1908, the United States Supreme Court changed the atmosphere by asserting the right of States to protect the health and welfare of working women, by limiting their hours of labor. Within the next two years, the highest courts of three States—Illinois, Michigan, and Louisiana—followed suit.

These decisions have freed the subject of women's hours of labor from narrow technicalities. The protection of women from overwork is recognized as one of the great issues of any nation, in its effects on health and welfare, on social and economic life.

The effect of these decisions has been electrical. During the first three months of 1911, three States passed 8 hour laws: California, Washington, and Colorado. Three States have passed 9 hour laws: Missouri, Ohio, and Utah. Delaware passed a ten hour law, but it failed to receive the Governor's signature. Three of these States, California, Missouri, and Utah, had previously had no laws whatever protecting adult women from overwork (except two laws about work in mines).

All these new laws are particularly valuable in setting a perfectly fixed and definite limitation of the day's work. Eight or nine hours' work is provided; there is no allowance for overtime. This is indeed one of the most important tests of effectiveness in laws limiting women's hours of labor; do they or do they not permit exceptions for overtime work, depriving women of protection at the very times when most urgently needed?

Thus, for instance, in Connecticut, Louisiana, New York, and Oregon, the laws which prohibit the employment of women in stores more than a specified number of hours, are totally suspended during the Christmas rush. When the work is most exhausting, the hours are left unlimited.

So, too, in seven States, Arizona, Connecticut, Maine, Minnesota, New Hampshire, New York, and Rhode Island, the laws allow the day's work to be lengthened at the employer's will, providing a fixed limit of hours only by the week. Overtime is permissible every day but one, so long as the weekly total of hours is not exceeded.

Such an arrangement encourages one of the worst existing evils in industry: irregularity of work. Physically, the working girl is not compensated by a shorter workday on Saturday, if she has been exhausted by days of overstrain. The rest comes too late, and as science has proved graphically and we all know by experience, the fundamental thing in rest is the time at which it comes. A muscle, artificially tired in the laboratory by a doubled amount of exertion, takes not twice as long, but four times as long to recuperate. The same is true of our total health. Fatigue is a debt to be paid not at simple but at compound interest.

So when seven States provide that work shall not exceed 58 or 60 hours, as the case may be, but leave the day's work unlimited, the workers cannot be considered adequately protected.

From the point of view of enforcement, too, these lax laws are damaging. The whole test and crux of such laws—indeed their whole excuse for being—is their enforcibility and enforcement. We do not want laws limiting the workday for the sake of having them on the statute books or for any academic purpose whatever. We want them for the sake of controlling the length of the workday.

Now when overtime is allowed after the day's work, it is almost impossible to enforce the law. When an inspector finds girls at work late in the evening, he cannot tell, without returning each day, whether a shorter compensating day is granted later in the week, to balance the overtime. Unless

the inspector should remain bodily on the premises, he cannot tell when work stops.

This brings up the all important subject of the fixed legal closing hour. We can realize how rudimentary our labor legislation for women still is from the fact that only three States prohibit women's night work after a specified hour. These three States are Massachusetts, Nebraska, and Indiana. And the Nebraska law is today hanging in the balance, its constitutionality on trial in the courts. Thus in contrast to the action of the fourteen civilized nations of Europe who have signed an international treaty to abolish night work, we have only three States—only one great industrial State—which have so legislated.

The opposition to protecting women from night work, the interests which demand such an inversion of normal life, can be gauged from the experience of Delaware last winter. A bill was introduced into the legislature prohibiting the employment of women after 10 P. M. in a wide range of industries. After great efforts of persuasion and with many amendments the bill was passed. These are the places of employment exempted from the provision against night work after 10 P. M.: laundries, canneries, telephone exchanges, restaurants, candy-stores, ice-cream saloons, and department stores between December 11th to 25—those establishments where night work and late evening overtime are notorious. Even the small measure of protection which remained was lost to the working women of Delaware through Governor Pennewill's refusal to sign the bill.

The question at once arises whether such work is necessary and inevitable. Is it unreasonable to ask that working women, handicapped by the physical burdens of sex, be protected by law from work under the most exhausting conditions, that is, at night and late in the evening after the day's work? The answer is found in the experience of the past. Inasmuch as such work will be considered necessary and inevitable until it is positively prohibited by law, then it is not unreasonable to expect that as in all previous similar dilemmas, greater efficiency and ingenuity will devise means of substitution. There has never been a single forward step in the protection of the workers, not one reduction of the hours of labor, which has not been considered difficult and even impossible until men have learned to adapt themselves to it.

For example, the laundries—the hours of labor in the exhausting laundry occupations are notoriously excessive. They run up to twelve and fourteen hours at the end of every week. It is claimed that such hours of work are unavoidable, because the laundries are obliged to return promptly linen from hotels, barber shops, restaurants and steamship companies, as well as private families. But another way out of the dilemma, and as must be apparent to every housekeeper, a more efficient solution has been adopted where linen cannot be laundered at a moment's notice. These establishments, which have previously insisted upon the almost immediate return of their linen have been obliged to lay in a larger stock. There does not appear to be any reason why such a solution should not be adopted instead of the indefensible overwork of girls and women until midnight or later. It is automatically adopted, when it is necessary.

Irregularity of work, involving long days of over time, is one of the evils due to inefficient management which the new scientific management of industrial establishments will most assist in reducing. It has already done so in numerous establishments. For instance, the shoe trade has long been one of the industries subject to seasonal pressure, overwork alternating with enforced idleness. One of the large shoe factories in the United

States has worked out a system, whereby each month's output is accurately reckoned in advance. Instead of compressing work into a short season of excessive hours, it has been spread uniformly over the year. Orders must be received by specified dates, and are executed also at dates fixed in advance. Overtime has been wholly done away with. The regularity of work, which has replaced it, is as advantageous financially to the employers, as it is in every way for the employees.

But it is only the most progressive and enlightened employers who are far-sighted enough to inaugurate such changes, spontaneously. It is so much easier, so much more in line with natural human inertia, to keep employees at work who are on the premises rather than plan work in advance, that overtime takes on the appearance of actual necessity. But when the law authoritatively intervenes to protect workers helpless to protect themselves, the standards of the backward employers are forced upward.

An interesting example of the effect of legislation on employment in the telephone service may be seen in Louisiana. Before 1908 there was no special legislation restricting hours of labor which affected telephone operators. In that year the employment of girls under 18 years was prohibited between 7 P. M. and 6 A. M. At that time there was a large proportion of operators under 18 years of age. The Bureau of Labor's investigators reported in 1910 that the Cumberland Telephone Company at New Orleans still employed 25.5 per cent operators under 18 years of age. But they were all on day work. They could not be worked at night nor in the evening. In the neighboring State of Georgia, no law affected the employment of telephone operators. The Bureau of Labor reported that in Atlanta 26.1 per cent of all operators were under 18 years of age. Instead of being on the day force, as in Louisiana, 12.5 per cent of these young girls were on evening work, 15 per cent were employed at night, and 25 per cent were on the split-time force—all three being forms of employment wholly objectionable for girls under 18 years, prohibited in Louisiana by the requirements of the law.

The whole history of textile legislation, both in England and in Massachusetts, our oldest industrial State, shows how legislation limiting the length of the workday has been enacted in the face of yearly opposition, and how the industry subject to the strictest and most definite regulation has thriven.

No arguments are more telling than the fact that Massachusetts, like England before it, has had to amend its legislation steadily in the direction of greater rigidity and exactness in order to get its laws enforced.

The Massachusetts textile law is the fruit of almost forty years of experience. After two commissions of investigation in 1866 and 1867, the first Massachusetts law for adult women was enacted in 1874. Since that date to the present day, there has been a slow movement, making the law more and more rigid and definite on its requirements, as experience proved how enforcement was hindered by the laxness of the earlier statutes. The present law prohibits the employment of women in textile mills after 6 P. M. and before 6 A. M. or more than 10 hours in one day, or 56 hours in one week. Now, Massachusetts, so long the leader in legislation for working women, has been overtaken and passed by the States which have enacted eight and nine hour laws during 1911.

Indeed, the example of Massachusetts was a menace to the success of the eight hour bill in California this winter. Cotton mill owners in Oakland resented the prospect of the eight hour day and 48 hour week, while

Massachusetts still allowed the 10 hour day and 56 hour week, and did their utmost, unsuccessfully, to defeat the bill.

Even stranger than the spectacle of Massachusetts as a drag on the progress of other States in the protection of women, is Massachusetts conspicuous by its absence from the list of States who protect working children. Is it not incredible that in the Commonwealth of Massachusetts, as in every State where the textile industries are strong, young boys and girls on reaching their fourteenth birthday may be worked 10 hours in the day? Adult workingmen are obtaining the 8 hour day for themselves by trade agreement in many great industries throughout the country. Only ten States have as yet given the same measure of protection to young children, between the ages of 14 and 16 years, the most critical years of adolescence. The States are: Arizona, Colorado, Oklahoma, and North Dakota in the far west; Wisconsin, Kansas, Nebraska, Illinois, Indiana and Ohio in the middle west, the District of Columbia and New York in the east.

But neither Massachusetts nor any other textile State has so legislated. This is not chance. It is deliberate design. The textile industry needs children. Shall it be allowed to work them contrary to the most obvious laws of health? Will Massachusetts be content to remain in the rear of the procession, so far as concerns her working children in the mills? Or will she return to her role of pioneer and be the first textile State to pass an 8 hour law for children? Such a bill has been twice defeated in the Massachusetts legislatures of 1909 and 1910. It has yet to be enacted by the legislature of 1911.

THE OHIO ACT REGULATING THE LOANING OF MONEY

The legislature of the State of Ohio has passed an act regulating and licensing the loaning of money upon chattels and personal property of any kind and of purchasing or making loans upon salaries and wage earnings.

The main provision requires licenses from those who engage in the business of making loans, these licenses to be made in writing with full details. Every person, firm or corporation licensed must give to the borrower a paper, giving full details of the loan, including the amount of interest charged, expense charged in excess of interest, the time for which such charge is made, the date of making loan, and the date when payable, together with a receipt for each payment of princpal, interest or any other charge.

Blank assignments of salary are forbidden, but the name of firm employing borrower shall be clearly designated.

Eight per cent is the maximum rate of interest permissible, in addition to which a sum not to exceed ten per cent on the principal sum may be charged for expenses.

When the rate is usurious, payments made by way of interest, whether in advance or not, shall be deemed payments made on account of principal or may be recovered before the court.

No judgment shall be rendered against the borrower in excess of the amount of the principal borrowed.

CONFERENCE ON THE LOAN SHARK EVIL

A. H. Ham

In the campaign to improve loaning conditions in New York and other large cities, the Conference on the "Loan Shark" evil, held on May 18, under the joint auspices of the Russell Sage Foundation and The Merchants' Association of New York, was a marked success. It has enlisted the interest and support of large employers of labor, of whom about seventy-five, the number invited, attended in person or were represented.

The Conference was presided over by Mr. Henry R. Towne, President of The Merchants' Association of New York.

The various phases of the salary loan problem were ably discussed in brief addresses. The thorough consideration given the subject is indicated by the following program of the Conference:

"The Salary Loan Problem—Its Extent and Effects."

A. H. Ham, Agent, Russell Sage Foundation.

"The Present Legal Situation."

Walter S. Heilborn, of Gallert & Heilborn.

"Attitude of Employers Toward Assignment of Wages."

Hon. Isidore Straus, of R. H. Macy & Company.

C. D. Meneely, Vice-President and Treasurer, Brooklyn Rapid Transit Co.

Jacob Gimbel, of Gimbel Brothers.

"Legislative Regulations."

Hon. Ansley Wilcox.

"Co-operative Loan Associations—The Salary Loan Remedy."

Pierre Jay, Vice-President, Bank of Manhattan Company.

Edward E. Pratt, New York School of Philanthropy.

After the addresses a general discussion ensued, which was followed by the unanimous adoption of four resolutions embodying the following recommendations:

First: That employers rescind rules of discharge, in order to assist employees in resisting unreasonable interest charges and deprive money-lenders of the power of extortion.

Second: That all employers disregard claims filed by money-lenders against the wages of employees, not in direct compliance with law, the employers to interest themselves in assisting employees involved with loan sharks.

Third: That, in self-interest as well as for the benefit of their employees, all large employers of labor encourage and assist in the creation of co-operative savings and loan associations in their respective establishments.

Fourth: That laws be enacted which will allow a reasonable rate of interest on all small loans and provide for the licensing of money-lenders and the efficient supervision and control of such licensees, preferably under the supervision of the State Banking Department.

Mr. A. H. Ham, who, as Agent of the Russell Sage Foundation, has been engaged during the past three years in investigating the conditions, spoke of the amazing extent to which the salary loan business has grown in a comparatively few years, the bulk of the loan shark victims being

employees of the City Government and of large corporations, who ought not to be borrowers because their wages are above the average and the employment secure.

The extent of the usurious loan business in New York City is $20,000,000 annually, the net profit of the money-lenders exceeding 100% a year on the capital invested. The fear of discharge, due to the attitude of many employers toward men who assign their wages for loans, serves the loan shark as the most efficient collection agency which could be devised. The losses in the salary loan business, therefore, are nowhere near so large as the loan sharks claim. Evidence that the borrower's fear of discharge gives the lender the potential means of extorting high rates is found in the fact that salary loan sharks will not, as a rule, lend to those employed by concerns where the rule of discharge does not exist.

The salary loan business is an influence tending to decrease the efficiency of employees to an alarming extent, as it offers many temptations to embezzlement and forgery, of which Mr. Ham cited several cases to illustrate his point.

The address was closed by a strong appeal on the part of Mr. Ham to employers, in dealing with the salary loan problem, to provide measures designed to benefit the worthy employee who needs temporary help in the time of sickness or other crises.

Mr. Walter S. Heilborn reviewed the recent decision in the New York Supreme Court, in the case of Thompson vs. Gimbel Bros., decided in favor of the latter. The decision, which was obtained under Section 42 of the Personal Property Law, requires the loan company to file on a salary loan within three days after the actual making of the loan. The decision is all important as a weapon against the loan shark, in that it removes secrecy from the salary loan transaction. The employee is not likely to make the loan if the employer is to become aware of it within three days after the transaction. Mr. Heilborn argued that in almost any case that may arise the employer may safely disregard a notice of assignment of wages, if said file has not been made by the money-lender in strict compliance with law, namely, within three days after the loan was actually made.

Hon. Isidor Straus very emphatically stated that, under his personal direction, his firm, R. H. Macy & Company, has refused to honor assignments filed against the wages of its employees, notwithstanding the representations of the attorneys of the loan companies, and that the firm would not vary its policy in this regard until forced to do so by a decision of the United States Supreme Court. While it would not pay to a loan company one dollar on any assignment of wages, the firm is prepared to spend tens of thousands to determine the issue in the Courts. Furthermore that it is the fixed policy of the firm not to discharge an employee for assigning wages. As it is known among money-lenders that R. H. Macy & Co. will interest itself in any employee involved with a loan shark, the attempts to use the firm as a collection agency on an assignment of wages are very few. Mr. Straus also gave some facts and figures concerning the firm's Mutual Aid Association, which aims to help worthy employees when they need financial assistance.

Mr. C. D. Meneely, Vice-President-Treasurer, Brooklyn Rapid Transit Company, said that about ten years ago his corporation, on the recommendation of its Legal Department, decided on the policy of refusing to recognize assignments of wages. The loan companies brought three or four cases in Court, in defending which the corporation placed the borrower on the stand to prove usury. All the cases were won by the corporation. For

a short time thereafter the loan companies brought a few more suits, which were abandoned as soon as he, accompanied by the borrower and counsel, appeared in court. In thus defending worthy employees involved with loan sharks, the corporation greatly benefited itself, because the money-lenders quickly realized the futility of filing and the danger in bringing suit to collect. The Company's Mutual Aid Association supplies the aid to employees which might otherwise be sought from the loan shark. The Company's rule at the present time simply requests employees not to assign their wages, in place of the mandate in effect years ago summarily discharging an employee for such an act.

Mr. Jacob Gimbel, of Gimbel Bros., reviewed the policy of his firm here and in Philadelphia in handling the problem, their plan being substantially the same as that of the companies referred to above. Employees are not discharged for having borrowed money, claims against wages filed by loan companies are not honored, and the firm undertakes to help employees by loans in cases of distress, if an investigation of the facts proves that such aid will not result in harm to the employee.

Hon. Ansley Wilcox of Buffalo spoke of the essential provisions that should be contained in a model law dealing with small loans. Reviewing the present State Law regulating pawnbrokers and the chattel mortgage loan law under which personal loan associations may charge a reasonable rate of interest under proper supervision, Mr. Wilcox pointed out that some such law is needed in respect to salary loans; that with an interest rate of 6 per cent. per annum, which the present law provides, it is impossible to do business honestly. Recognizing the economic need for salary loans among certain classes of people who would not be able to obtain loans from the present remedial agencies in the field, such as the co-operative loan associations, there is an urgent necessity for the passage of new legislation which will permit salary loan companies to operate on a reasonable basis under proper supervision and control. This control, Mr. Wilcox says, should be placed in the hands of the State Banking Department. Mr. Wilcox further reviewed the present statutes covering confessed judgment notes. In his opinion these laws, which allow money-lenders to file a confession of judgment, even when less than $50 in amount in a county clerk's office and obtain costs of $15 in addition to their usurious interest charges, are pernicious and ought to be amended.

A paper by Pierre Jay, Vice-President of the Bank of Manhattan Company, who is an authority on the formation and management of co-operative loan associations, called attention to the success of co-operation in the form of the credit unions in Europe and Canada and those recently organized in Massachusetts. The paper outlined the fundamentals of this form of co-operation, which it showed is entirely applicable to conditions existing in large industrial establishments in this City.

Mr. E. E. Pratt of the New York School of Philanthropy discussed the various methods adopted by employers to counteract the salary loan evil and outlined the employees' or co-operative savings and loan associations which are in operation in many industrial establishments. These associations, in order to be most successful, must be under the control and administration of the employees themselves. They are based on the following practical principles: One—Facilities for saving are placed at the command of the workingmen, who, after starting to save, are almost compelled to continue. Two—Security for loans is the borrower's reputation for reliability, based on the shrewd judgment of his fellow-employees. Three—Interest on loans made to borrowers pays a considerable profit on savings in comparison with the market interest. As an encouragement to thrift, saving is

encouraged by the large rates of interest made possible by the loan business conducted by the association. The usual charge to borrowers is about 1 per cent. a month. The machinery for carrying on such an association is simple. An organization is effected with the usual officers and board of directors made up of employees from different departments in order that their acquaintance may be a wide one. This board of directors passes on loans, although this function may be delegated to a finance committee. Loans are made without security, except above certain amounts, when the notes must be endorsed by one or more fellow-employees.

Mr. Pratt contended that a co-operative savings and loan association will solve in large part the salary loan problem, will bind employees together in an association for mutual benefit and will help to create that which every employer is earnestly seeking to bring about an esprit de corps among employees, a unified and efficient working organization.

Mr. Fred C. Lawton, Superintendent, Gorham Manufacturing Company, Providence, R. I., described the highly successful co-operative savings and loan association, managed entirely by the employees, connected with that corporation, the operation of which has almost entirely eliminated the loan shark and helped the employees and the Company.

Mr. P. E. Ward, Secretary, Myrick Credit Union, Springfield, Mass., described the credit union system operating in some cities in Massachusetts. Mr. Ward, who, because of his association with the Orange Judd Publishing Company of Springfield, has considerable knowledge of the evils of the salary loan business, believes that "every manufacturing plant can and should encourage, sustain and operate through its employees a loan organization of some kind. It will keep employees out of the hands of loan sharks, pawnbrokers, credit clothiers and others who prey upon the needy; it will aid in maintaining better and more agreeable relations between the employer and the employee, relieving the employer of much embarrassment and possible expense from litigation. Even where the employer takes a kindly interest in assisting needy employees, there are elements of paternalism which is not helpful. The properly conducted savings and loan association removes the necessity of this. Coupled with the large number of offices, committees and boards necessary for the proper conduct of a co-operative savings and loan association and the wide distribution of these offices among the membership, the employee develops self-reliance, caution and good business sense, all of which represents increased efficiency and an asset to the employer."

Mr. S. T. Simmonds, Manager of the Savings and Loan Department of The Celluloid Club, described the activities of that department, which he considers one of the most valuable of the various forms of welfare work undertaken and encouraged by The Celluloid Company, Newark, N. J. The Savings and Loan Department was organized in 1906 to encourage saving and furnish temporary financial assistance to employees of The Celluloid Company. The employees may become depositors at any time in sums not less than 25c weekly, receiving interest on deposits at about 10 per cent. per annum. Any depositor who has been in the employ of the company for one year may obtain a loan running from a rate of 1 per cent. a week to 6 per cent. per annum. The maximum loan is $200. On loans of less than $25 a simple note is taken, but on loans greater than $25 one endorser is required. The Officers of the Company are not in any way connected with the department, except that they stand ready to advance money needed when loans have not been paid in sufficient amounts to repay depositors at the time of withdrawal. That the savings and loan department has been very successful in accomplishing its purpose is shown by the fact that of

the 1300 men in the employ of the Company, more than 600 are depositors, and the loan shark no longer finds there fertile field for his exploitation. Since its organization it has loaned about $60,000, with losses of less than $100.

Among others, the following prominent and large employers of labor were present at the Conference:

Henry R. Towne, President, Yale & Towne Mfg. Co. and President The Merchants' Association of New York; Jacob Gimbel, of Gimbel Bros.; J. W. Lieb, Jr., V. P. New York Edison Co.; Arthur Williams, Gen. Mgr. New York Edison Co.; H. F. Thurber, V. P. and Gen. Mgr. New York Telephone Co.; John C. Eames, V. P. and Gen. Mgr., The H. B. Claflin Co.; C. D. Meneely, V. P. and Treas., Brooklyn Rapid Transit Co.; J. T. Mason, Legal Department, Brooklyn Rapid Transit Co.; Hon. Isidor Straus, of R. H. Macy & Co.; W. A. Marble, V. P. of R. & G. Corset Co.; Dr. Lee K. Frankel, Asst. Secy., Metropolitan Life Insurance Co.; Hon. G. W. Hubbell, Gen. Counsel, N. Y. Life Insurance Co.; W. H. McCord, President, Post & McCord; E. W. Bloomingdale, A. L. Lyman, Gen. Atty., New York Central & Hudson River Railroad; R. H. Wallace, Gen. Passenger Agent; W. J. Moody, Traffic Department, Erie Railway; Raymond Fosdick, Commissioner of Accounts, City of New York; Frank R. Chambers, of Rogers Peet & Co.; Walter S. Heilborn, of Gallert & Heilborn; Marcus M. Marks, of David Marks & Sons; C. J. Voorhis, Mgr., North River Insurance Co.; S. W. F. Draper, Gen. Mgr., New York Transfer Co.; Charles Eddy, Secy., American Lithographic Co.; John M. Glenn, Director, Russell Sage Foundation; T. Ludlow Chrystie, Secy., Grievance Committee, Bar Association; R. Llewelyn Rees, of Rees & Rees; L. B. Judson and W. E. Judson, of General Electric Co.; R. F. H. McDonald, of O'Brien, Boardman & Platt, Attys. for U. S. Express Co.; Walter H. Morrall, of Acker, Morrall & Condit; A. L. Strasser, Atty., Steinhardt Bros. & Co.; Frank Tucker, V. P. Provident Loan Association; E. E. Pratt, New York School of Philanthropy; Duff G. Maynard, Second V. P., The Celluloid Co.; Hon. Ansley Wilcox, of Buffalo; H. S. Julier, V. P. American Express Co.; Harry Dowie, Secy., DeWinter & Co.; F. W. Portener, of Portener & Co.; L. Lemon, of the Postal Telegraph Cable Co.; W. Frank Persons, Supt., Charity Organization Society; William H. Baldwin, of Washington, D. C.; C. C. Wells, of R. G. Dun & Co.; C. V. Fowler, Gen. Agent, Wells Fargo & Co.; F. C. Lawton, Supt., Gorham Mfg. Co., Providence, R. I.; S. T. Simmonds, of The Celluloid Co.; J. B. Reynolds, Esq., Asst. District Attorney of the County of New York; S. W. Hunt, of Duche-Graves Licorice Co.; Leslie Graff, Secy., Retail Dry Goods Association; G. F. Cromwell, of the H. B. Claflin Co.; Leonard McGee, Atty., Legal Aid Society; P. E. Ward, Secy., Myrick Credit Union, Springfield, Mass.; S. H. Ditchett, Managing Editor, Dry Goods Economist, and others.

NATIONAL FEDERATION OF REMEDIAL LOAN ASSOCIATIONS

ARTHUR H. HAM

The second annual meeting of the National Federation of Remedial Loan Associations, held in Boston, June 12th and 13th, comprised five sessions. All but three of the societies that are members of the Federation were represented and an unusually large number of social workers in attendance on the National Conference of Charities and Correction were attracted to the meetings of the Federation. One of the meetings was a joint session with the committee on Families and Neighborhoods of the National Conference, which was given up to a discussion of remedial loans as factors in family rehabilitation. A paper was read by the writer and discussed by E. T. Lies, Minneapolis, T. J. Bruno, Colorado Springs, L. C. Logan, Atlanta, Ga., Frank Tucker of New York and others. Of the remaining four sessions of the Federation two were given up to a formal program, one to a discussion of various types of co-operative savings and loan associations, and one to business.

At the first of these meetings reports were read by the chairman, W. N. Finley, of Baltimore, the secretary, J. T. Exnicios, of Washington, and the writer. These reports indicated a gratifying increase in interest and understanding of remedial loan work during the past year, as evidenced by the growth of the Federation membership of 50 per cent, the large number of cities reported as being about to organize remedial loan associations and the fact that of twenty-two states legislating on the small loan business during the year, in only one has a determined effort been made to pass drastic laws limiting the interest rate to 6 per cent per annum. Others, realizing the futility in attempting to remedy the loaning conditions by such means are making an effort to enact measures allowing reasonable interest rates, fair alike to borrower and lender.

Papers were read by F. E. Stroup, of Grand Rapids, Mich., on "Remedial Loan Work in Grand Rapids," and J. H. Rubin, of Milwaukee, Wis., on the "Causes Which Make Borrowers." Six-minute reports were read by the representatives of the remedial loan societies making up the Federation containing information on the following points:

(a) What has each society done in its home city to improve loaning conditions?

(b) Is the society meeting the need?

(c) Is it difficult to secure the required capital under limitation of dividend feature?

These reports indicated that the remedial loan societies are rapidly replacing the so-called loan sharks in their respective communities and that the limitation of dividend to 6 per cent per annum does not prevent an increase in capital sufficient to meet the demands of the borrowing public, though a few of the societies reported that contributions to capital are not keeping pace with the demands of borrowers.

At another session papers were read by Hugh Cavanaugh, of Cincinnati, Ohio, on the "Chattel Loan Association a Necessity," by Charles E. Burnham, of Worcester, Mass., on "How to Control the Evil of the Salary Loan," and by R. M. Rutherford, of Louisville, Ky., on the "Progress of Remedial Loan Work in Louisville."

The third session was taken up by a discussion of co-operative savings and loan associations, which are being formed in industrial establishments

by employers and employees as a distinct remedy for the salary loan evil and of the advisability of admitting certain of these associations to membership in the National Federation of Remedial Loan Associations. The matter was eventually referred to the Membership Committee with instructions to make a further investigation and report to the Federation. The plan of the Fidelity Savings & Trust Company of Norfolk, Suffolk and Newport News, Va., and Atlanta, Ga., a new type of Remedial Loan Association that is attracting considerable attention in Southern cities, was presented by Mr. Redmond C. Stewart, of Baltimore, and Mr. Arthur J. Morris, of the firm of Morris, Garnett & Cotten, Norfolk, attorneys who originated the plan. An interesting discussion followed the presentation of the plan and the subject was referred to the membership committee for further investigation and report.

Hon. Ansley Wilcox described several bills which have been introduced in the New York Legislature dealing with the subject of small loans and asked for co-operation of the members of the Federation in order that a satisfactory bill may soon be drafted which can be urged for passage as a uniform law in all states.

The officers of the Federation were re-elected for the ensuing year.

On the evening of June 13th many members of the Federation attended a conference of credit unions held for the purpose of increasing interest in Massachusetts in the credit union plan which has been so successful in Canada and Europe. Four credit unions are now operating in Massachusetts under the authorization of Chapter 419 of the Acts of 1909. The gathering was addressed by Alfonse Desjardins of Quebec, who is known as the American father of the people's banks' idea. This meeting was well attended.

REPORT OF THE COMMISSION OF INQUIRY ON SMALL LOANS IN THE COMMONWEALTH OF MASSACHUSETTS

House of Repesentatives, June 29, 1911

The Committee on Banks and Banking, proceeding under the following joint order dated April 11th, entered upon its duties early in May.

"Ordered, That the Committee on Banks and Banking be authorized to investigate the operation of chapter 102 of the Revised Laws, regulating the business of making loans by persons, firms or corporations engaged in the business of loaning money upon mortgages or personal property, collateral securities or assignment of wages, or engaged in the business of making small loans without security, and for such purpose said committee shall have authority to summon and compel the attendance of witnesses, with books, papers and records of such business, and to administer oaths in accordance with the provisions of chapter one hundred and seventy-five of the Revised Laws. Said committee shall have authority to employ a stenographer, and shall report to the General Court, with their recommendations, on or before the first day of June in the current year."

Public hearings were held in room 439, State House, as follows: May 8, May 11, May 16, May 18, May 22, June 5, June 6, and June 8. A stenographer was sent to New York to attend the conference on the Loan Shark Evil May 18th, under the joint auspices of the Merchants' Association of New York and the Russell Sage Foundation at the Merchants' Association in New York, 60 Lafayette street.

Before the committee there appeared many witnesses, including the Bank Commissioner, the Police Commissioner of the City of Boston and his secretary, representative of the Chamber of Commerce, representatives of several large corporations, public service and other, and a number of prominent business men, many witnesses who had had various transactions with those loaning money, and finally representatives and officers of those loaning money and the loan companies.

The committee found the subject to be a highly technical one, with various statutes passed by several preceding Legislatures and that the complexity of the subject was such as to require careful but radical treatment and an entirely new method of effectively regulating the business.

After hearing much evidence and many suggestions the committee came to the conclusion that there were two classes of borrowers: the borrowers through necessity and the borrowers through improvidence, and had impressed upon it that money hunger, either the hunger of necessity or the hunger of wilful extravagance, could not be satisfied by pure loan laws which amounted to prohibition, any more than food hunger could be gratified by pure food laws which amounted to prohibition; that pure loan laws will be beneficial when they are practical; but that the operation of loan agencies under existing conditions approaching justice will do more to minimize the evils incident to the loan business than a great many laws based on suppression; that the class of borrowers through necessity must be provided for and that the class of borrowers through improvidence must not be encouraged; that the entire business of small loans was fraught with dangers and with complications, but that these dangers and complications made it the more necessary to have an adequate law and an adequate scheme for supervision.

The committee found that the operation of the present laws was such as to cause much hardship and abuse as well as a lack of uniformity in supervision and control, both by having each city and town regulate its local business, sometimes well and sometimes ill, and by the exemption of certain specially incorporated companies from the operation of chapter 605 of the acts of 1908, which attempted to place all persons making loans of $200 or less upon which a rate of interest was charged greater than twelve per cent per annum, under the control of the Police Department of the City of Boston, and of the Mayor and Aldermen in other cities, and in towns, of the Selectmen; that the statutes prescribing conditions and local regulations were successfully evaded and the most flagrant violations were in respect to the expense of making loans limited by the provisions of section sixty of chapter one hundred and two of the Revised Laws. The committee believes the only cure for these conditions is to create a central supervisory licensing power to be uniformly employed in the conduct of this business in every city and town in Massachusetts.

The committee found that in most cases the complaints were concerning the so-called "paper charges" for the making of loans, which were often collected on the renewal of loans under said section, but with conflicting evi-

dence was unable to determine whether an original so-called "paper charge" should be allowed or entirely prohibited; and if allowed, whether it should be limited to actual cash disbursements for appraisal of goods and recording fees, or not.

The committee also found that some of the specially incorporated companies should have more regulation and closer supervision than the law has permitted the Bank Commissioner to exercise.

The committee also found that in relation to the assignment of wages there might be a hardship by not exempting a certain amount from the operation of such assignments, and believes such exemption should be made.

The committee also heard much testimony regarding the hardships resulting from the assignment of wages by employees as security for loans, but much of the evidence showed that the employers of labor were unconsciously aiding the loan companies by their failure to acquaint themselves with the law which required their written acceptance and the wife's signature, if a married employee, and too often retained the employees' wages upon illegal assignments or discharged the employee.

The committee after communicating with all of the cities in the Commonwealth relative to the regulations of loan companies and pawnbrokers found that there was a lack of uniformity in the regulation of pawnbrokers and the interest charged by them, which was responsible for some injustice.

The committee deplores the fact that the provisions of Chapter 419 of the Acts of 1909, being "An Act to authorize the incorporation of Credit Unions," has not had more general advantage taken of it. Under this act which is co-operative in principle, the workingman and employee may create his own loan company; only honest and industrious persons are admitted to membership; loans may be made to members only; a borrower may offer either property or the indorsement of one or more members as security for his loan; no loan shall be made unless the Credit Committee approves the object for which the money is to be used; the use of the money for any other purpose renders the borrower liable to expulsion from membership; at all meetings a member has only one vote, irrespective of the number of shares he or she owns. These credit unions are in effect associations of the lenders themselves, receiving the benefit of the money they loan. Recent data show that there are more than twenty-five thousand of these institutions in operation in European countries, having a membership of over three million, and total assets of one billion dollars, and that they have been of great advantage and service to the communities in which they have been established. They constitute a medium through which farmers and small trades-people and workman of good character and industrious habits may join together to collect small savings and to provide loans to those of their associates whose credit is not recognized by banks of discount.

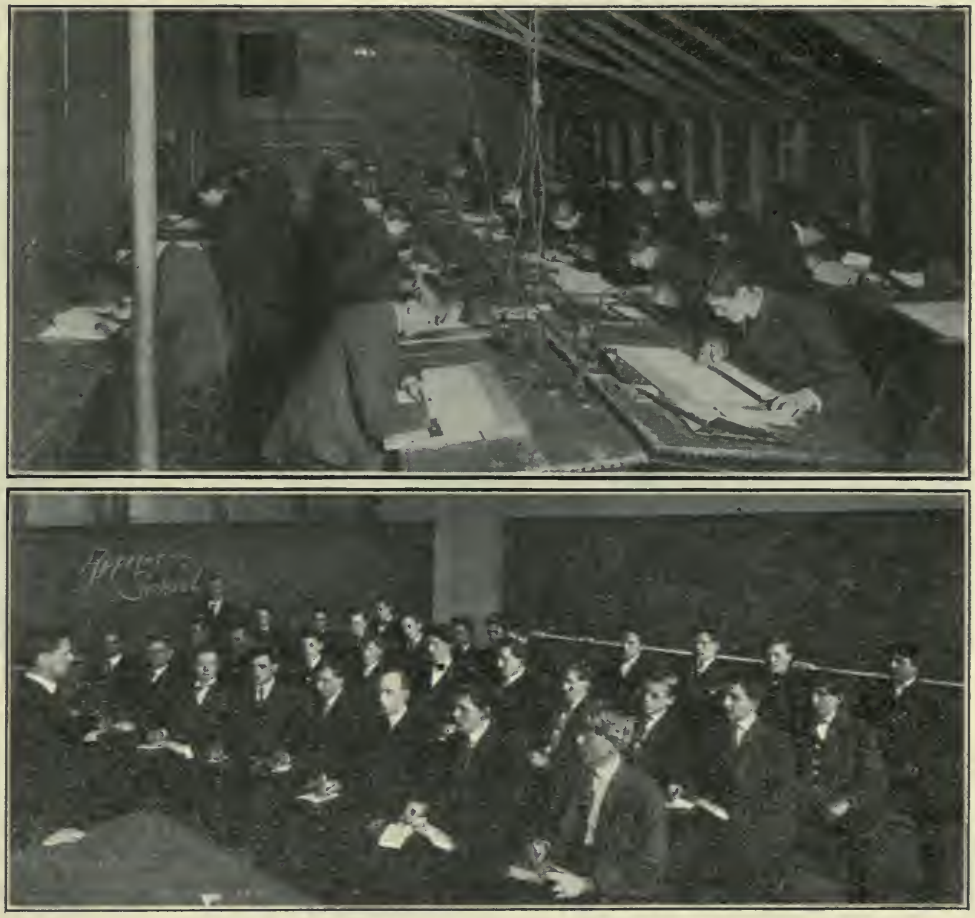
In addition to the service of these associations in stimulating thrift and providing necessary loans they have also proved to be effective moral and educating agencies: Moral because no one is admitted to membership except after careful scrutiny of his honesty and industry, thereby affording an object lesson of the value of these traits of character; and educating because they teach the value of saving in small amounts and the necessity of prompt payment of obligations. Furthermore, the fact that the purpose for which a loan is desired must be stated to the Credit Committee exercises an important influence, for by this means improvident and thriftless borrowing is effectively prevented in these institutions. In the establishment of any agency for supplying credit to small borrowers it is important that this element should be emphasized, for unrestricted opportunity to obtain loans, even though security be demanded, has elements of danger for those unaccustomed to the use of credit. The committee sincerely hopes that Chapter 419 of the Acts of 1909, allowing the incorporation of credit unions will be taken full advantage of by the industrious and honest people of the Commonwealth.

The question of regulating the small loan business is one that has occupied the attention of various philanthropic bodies and the Legislatures of almost every state, and many laws have been enacted in an attempt to confine and regulate the business within reasonable limits, but with ill success and in most cases failure. The committee believes that if the business is to be successfully regulated with equal justice to the borrower and the lender, legislation which is drastic must be placed upon the statute books. While the recommendations of the committee are in their nature far-reaching, the committee believes that the abuses and evils which today exist in this business will be speedily eliminated and that the business will be conducted upon a fair and honest basis if they are enacted into law.

CO-OPERATIVE INDUSTRIAL TRAINING AS A WAY TO INDUSTRIAL EFFICIENCY

ROBERT T. HILL, Ph. D., Educational Secretary, International Committee of Young Men's Christian Associations

An Ohio manufacturer said recently, that 75 per cent of his manufacturing costs was paid out in wages and salaries. Every effort is made to purchase the best raw materials in the cheapest markets. Machinery, tools and buildings are groomed, inspected and cared for with the utmost diligence; but little is spent in improving the operative efficiency of the workmen as far as special training is concerned. The boy is apprenticed and secures his training in the shops as well as he can but, generally, he has never been beyond the grammar grades and no provision whatever is made



Building Trades Apprentices, Chicago, Illinois

either by the specific employer or by the city, through its public schools, to provide the foundation, plus the special training which every boy needs today to become an expert journeyman of the highest type.

This case is typical of American industry though the proportion of manufacturing costs paid out in wages generally may not be so high. This example illustrates those conditions which make it necessary for a large manufacturing concern in another neighboring Ohio city to maintain an office in New York where they recruit skilled workmen from Germany, Belgium, and other continental countries, where young men are adequately trained for technical positions in the industries.

The country at large and manufacturers in particular are realizing rapidly that, as good as our splendid public schools are, they do not adequately meet the needs of industry, trade and commerce. From 85 to 90 per cent of the boys of the country never enter high school and if they did they could secure but little if any training which would fit them for specific trades or industries. Fifty per cent of the boys of the country receive no more than six years of schooling and many of these do not even secure the fundamentals of an education which fits them for the highest skill. Indeed, it is a question of importance whether the schools alone can or should be made to provide a complete training for those in various vocations. It seems more desirable to combine in some way industrial practice and school training after the earlier school periods when foundations should be laid. For this reason the so-called Cincinnati plan of combining school and shop is regarded with very much favor. The old apprentice system has virtually passed away; a new apprentice system suited to each trade or each plant is desirable and practically necessary.

American manufacturers today are finding themselves in a position



Structural Steel Design, Cleveland, Ohio

similar to that of German industrial leaders several decades ago. Highly trained men are needed, yet there is a dearth of them on the labor market. As a result, concerns like the General Electric Company and the Westinghouse Company, and railroads like the New York Central and the Santa Fe are operating systems in apprenticeship training of their own of far-reaching importance by a combination of school and shop.

Generally, however, concerns with fewer employees have difficulty in conducting their own schools and many large establishments are not yet prepared to provide special training facilities, though a highly trained labor force is just as important to them as any other factor in production and generally more so. Moreover, they are in the business of making goods and the adequate training of workmen is a factor whose value has not been appreciated fully. A change is taking place, however. Men who formerly paid little attention to increasing the efficiency of their labor force through specialized forms of training or those who have desired to provide for it but who saw no way out of their dilemma are accepting various co-operating schemes between manufacturing and business concerns and private, public

and semi-public educational institutions. It is in this field that the Young Men's Christian Association has been especially successful in the organization and conduct of co-operative industrial and apprentice schools.

In following one of its fundamental policies: viz., adapting its work to meet local needs, the Association, in trying to assist the worker on one hand and his employer on the other, has developed its work in industrial and technical subjects rapidly during recent years and special schools adapted to meet the needs of industry, trade and commerce have taken a variety of forms. Including general class work, enrolling over 60,000 students in from one to two hundred different subjects, distinct apprentice schools or courses extending from two to five years in length, involving the particular forms of training necessary for boys and men in manufacturing plants and industrial concerns have been provided as follows:

1. General: Boys from many employers. Conducted in evening four to six hours per week; outside of company time; for boys or men or both; a general course of one or more years; conducted outside of the plant as in



First Year's Work, Lupton Sheet Metal Apprentice School, Kensington Branch, Philadelphia, Pennsylvania

the Association; receiving no company support; students paying small or large tuition fees. Of these there are a large number and much good is being done. Some of the industries represented are: Shoe manufacturing, piano building, structural steel, machine trades, automobile construction, naval architecture, watch making, printing, building trades, etc.

2. Special, a single company. Conducted partly in the evening and partly in the day; six to eight hours per week; partly on company time and partly in the evening; boys 18 to 22 years old; with definite course of study three to four years; partial support by the company; part of the school work conducted at the plant and part at the Association; students paying a tuition fee. The Association Apprentice School of the Lupton Company of Philadelphia has been a type. In no two places can exactly the same plan be operated.

3. Special, on company time. Conducted in the day time; include six to eight or more hours per week; on company time; boys 18 to 22 years; definite course of study, four years; partial support by the company; part

of the school in the Association and part of the training in the plant; students paying tuition fees. The school at Wilmerding in co-operation with the Westinghouse Air Brake Company is a type.

4. A corporation school under Association auspices. School conducted in the day time; four hours per week; on company time; boys 18 to 22; definite course of study four years; wholly on company's support; school conducted entirely in the plant but under Association leadership; students pay no tuition fees. The Delaware, Lackawanna & Western Railroad Apprentice Schools are a type.

5. A corporation school conducted in Association building for six or seven hours per week, not on company time but wholly at company's expense the same as above. The Cotton Belt Railroad Apprentice School under Association auspices at Pine Bluff, Arkansas, is a type.

6. A joint co-operative school involving several concerns. Picked apprentices or men from each firm; conducted day or evening in Association building wholly, partly or not at all on company time; expense paid wholly or partly by employers; definite course of two to five years. Fifteen companies co-operated at Bridgeport, Connecticut, until State Trade



Second Year's Work, Lupton Sheet Metal Apprentices, Kensington Branch, Philadelphia, Pennsylvania

School was established. The Association school, however, is larger than before. The South Bend, Indiana, School, with five co-operating companies, including Studebaker Brothers, also schools at Toledo and Cleveland, Ohio, are typical.

7. Building Trades Apprentice School. Three months in winter, in the Association but parallel to a course conducted by the public schools and meeting the requirements of the building trades. Expense borne by the Association but the students pay $27 tuition fee. Such courses can be obtained free in the public school. The school in Chicago is a good type.

8. Half-time co-operative schools. There will be many kinds of these depending upon local conditions. Usually one boy attends school one day, or one week, while his alternate attends the next day or the next week. It means two men employed each for half salary and half time for the same position. The support is shared by the company, the Association and the student. The course aims to meet the need of the individual. The Detroit Association school is an illustration.

9. Continuation schools may be conducted on any of the above types; day or night, or both; for men or boys, or both; with general or special

courses, or both; supported by the Company or by the Association, or both; conducted in the plant or in the Association, or both, depending upon circumstances.

These various forms of apprentice training show several varieties of co-operation in which employer, employee and the Association are profitably working with the utmost harmony. Sharing responsibility, each makes an effort to produce best results. The student profits by his increased efficiency; the employer increases his skilled force; the Association is contented in having served each and through them the community. Teachers are practical, generally shop trained men approved by the employers but secured and under the direct supervision of the Association. Reports are made regularly as to progress of the students. Instruction is adapted strictly to the various employments involved.

Employers of experience in this work, either in the Association or in co-operation with other institutions, report very favorably on results. The expense involved is justified. The attitude of the apprentice boy toward his employer, foreman and machine is greatly changed. Other things being



Instruction in English for non-English Speaking Men at Noon Hour,
Derby Desk Company, Somerville, Massachusetts,
under Association Supervision

equal, the best apprentice boy is one who has finished the grammar grades, if not the high school. Apprentices just entering these schools appreciate them the least, but a few weeks of shop and school change their attitude almost entirely.

These special forms of industrial training are a part of the far-reaching scheme of supplementary education which the Young Men's Christian Associations in North America have been developing within recent years. During the past five years the increase in the number of students alone has averaged over 4,000 annually. The total number of students today is now almost 62,000. Whereas several years ago comparatively few were registered in industrial, technical and practical science subjects, today about 35 per cent of the total number are pursuing courses particularly relating to departments of modern industry. With a great increase in material equipment during recent years to an aggregate capitalization of about $75,000,000, and with an increasing desire to yield adequate returns on this capitalization the Associations are making industrial and vocational training a prominent and effective part of their programs in applied Christian

work. That the men and boys who secure this training appreciate it is indicated by the payment of about $600,000 in tuition fees. It costs much more than tuition receipts to provide this kind of supplementary education but returns are so large that far-seeing business men and public spirited citizens increasingly are lending it both their moral and financial support. Some of the other forms of work involved in pioneer system of supplementary education are libraries and reading rooms which during the past year have circulated more than a half million books; 8,220 lectures and practical talks inside and outside buildings have been given and attended by not less than 400,000 men and boys in all walks of life. Twenty-two



Machine Apprentices, Day School, Fifteen Different Companies Cooperating, Bridgeport, Connecticut

thousand men and boys are members of literary, science and technical clubs. Ten thousand foreigners have been taught English during the past year and according to a New England estimate, with a knowledge of English, their value and hence their earning ability has increased twenty-five cents a day. Over 3,000 men and boys have pursued courses in first aid to the injured and a large proportion have taken the official examinations and won the official Red Cross and International certificates.

Thus the Association today seeks to serve men in a practical way. By increasing their efficiency it thus helps them raise their standards of living; it provides a larger skilled working force for industry and thereby increases, systematically, the industrial, economic and social welfare of the nation.

BULLETIN OF THE JOINT BOARD OF SANITARY CONTROL IN THE CLOAK, SUIT AND SKIRT INDUSTRY

This is an era of conservation. Conservation of all natural resources. Conservation, not only of the natural resources beneath and above the ground, but also of human resources, of human energy and human life.

The economic value of human life is at last recognized. Also the folly, the danger, and the criminality of the terrible waste of human life in industries.

The prevention of industrial disease has become one of the most momentous problems of the century. The preservation of the health and life of the industrial population, the greatest of all ideals.

The employer of labor who still resorts to the cowardly plea, "Am I my brother's keeper?" justly bears the brand of Cain.

The employer who refuses to provide humane conditions in his industrial establishment, who neglects to protect the life and limb of his workers, or to install sanitary improvements for the promotion of their health, is justly regarded, not only negligent, but also criminal.

Ethically criminal. Economically wasteful.

Workmen in safe and sanitary shops are not only more healthy. They are

more efficient. Efficiency is the very soul of modern industry.

We hold these principles to be true and self-evident. As yet they are not accepted by all the labor employers. There is still need of protective and prohibitive Labor Legislation. There is still need of agencies for the enforcement of Labor Laws. There is still need for Labor Departments and Factory Inspectors.

Hence, the significance of the new departure in industrial life. Hence, the significance of the establishment and the work of our Joint Board of Sanitary Control in the Cloak and Skirt Making Industry.

Ours is the first attempt in the history of industry in this and other countries of a trade to control its own sanitary destiny. The efficient enforcement of Labor Laws can be accomplished only by the co-operation of the laboring people themselves.

The seventy thousand members of the Cloak and Skirt Makers' Unions and the several hundred members of the Manufacturers' Protective Association are the first to meet upon a common ground.

This is the first common ground upon which organized labor and organized capital may peacefully meet, and consists in "SAFE AND SANITARY SHOPS." The Joint Board of Sanitary Control is the first agency in this first historical attempt to bring the two together upon this common ground.

Report for May, June and July

Personnel: 2 inspectors, 1 office secretary, 1 messenger

WORK DONE

Inspections on Complaints	75
Original Inspections	168
General Reinspections	1,450
Total	1,693
Fire Exit Cards Distributed	6,500
Bulletin No. 1	2,000
Bulletin No. 2:	
Printed Yiddish	40,000
Printed Italian	10,000
Noon lectures given	24
Shop Committees appointed	25

RESULTS ACCOMPLISHED

On May 1st we had	
Shops Defective in Fire Protection and	197
Shops Defective in Sanitary Care	626
Total Defective Shops	823
On July 15th we had	
Total Defective Shops	54
Shops Removed	29
Shops which have made Improvements and Complied with our Orders	740

Beginning with July 15th, we are making a general shop to shop inspection of the Cloakmaking Industry in Greater New York.

Sanitary Certificates

The following shops have been inspected and found to conform to our "Sanitary Standards." The following firms therefore have been granted Sanitary Certificates:

Empire Cloak and Suit Company, 27 W. 24th Street.

A. Beller & Co., 37 W. 26th Street.

S. L. Silver & Co., 6 E. 32d Street.

A. E. Lefcourt & Co., 48 W. 25th Street.

National Cloak and Suit Company, 217 W. 24th Street.

A. J. Appel, 809 Broadway.

J. Autler & Co., 114 Fifth Avenue.

Maurice Bandler, 87-89 Fifth Avenue.

H. P. Belsinger & Co., 13-15 W. 24th Street.

W. J. Blumberg & Co., 160 Fifth Avenue.

Bodenstein & Oppenheim, 114-120 W. 26th Street.

J. H. Calden, 33-35 E. 21st Street.

Cohen Brothers, 928 Broadway.

Charles M. Cohen & Co., 27-35 W. 24th Street.

J. Cohen & Co., 22 W. 19th Street.

Edmonds & Lefkovics, 160 Fifth Avenue.

Faber & Hein, 15 W. 27th Street.

Fishman & Nathanson, 98 Fifth Avenue.

B. Gershel & Co., 160 Fifth Avenue.

M. J. Kashowitz, 18 W. 18th Street.

Louis W. Lapidus, 826 Broadway.

E. Newgass & Co., 45 W. 25th Street.

A. Portfolio & Co., 90 Fifth Avenue.

I. Rosenthal, 19-21 W. 24th Street.

Excerpts from Our Bulletin No. 2 to the Workers (in Yiddish and Italian)

Workingmen have a right and duty to DEMAND from their employers SAFE AND SANITARY SHOPS.

But the employers have a right to DEMAND from the WORKINGMEN themselves, that they should be clean, and should help the employers to keep the shop clean.

Let the WORKERS PROVE to their employers that they not only DEMAND sanitary and clean shops, but APPRECIATE them and will help to keep them clean.

Demand cleanliness from your employers, from your fellow workers, BUT DEMAND IT FIRST OF ALL FROM YOURSELF.

A Few Don'ts

Don't spit on floor.

Don't smoke in shop.

Don't throw matches on floor.

Don't throw paper and rubbish on floor.

Don't eat in shop.

Don't be afraid of air from an open window.

Don't work too near the gas lamp, and don't have the light shine in your eyes. Have it hang over your left shoulder.

Don't bend too much while at work.

Don't deface, soil, or mark the walls.

Don't fail to flush the water-closets.

Don't fail to wash your hands before and after work.

Don't blame others for your own faults.

Don't behave in your shops otherwise than you would in your parlor.

Don't do anything in your shop that you would not wish your parents or children to see or do.

Remember, workers, this is a movement not by the PUBLIC, not by the MANUFACTURERS—alone, but a movement—YOUR OWN, in CO-OPERATION with the PUBLIC and the MANUFACTURERS. If it fails, YOU must share the responsibility. It it succeeds (as it must, if you aid) YOU will share in the credit. Now is the time to show your real appreciation of what your Union is trying to do for you, and make your life worth living.

To Shop Owners

Our Sanitary Certificates are ready. All owners of shops which conform to the following standards are entitled to a certificate, which will be granted upon application and inspection. The possession of our "Sanitary Certificate" will be a positive indication that your shop is "SAFE AND SANITARY."

SANITARY STANDARDS

As Revised July 5, 1911

1. No shop to be allowed in a cellar.
2. No shop to be allowed in rear houses or attic floors without special permission of the Board.
3. Shops located in buildings two stories or more in height must have one or more fire-escapes.
4. All fire-escapes to be provided with ladders to the roof of same house or to an adjoining house; also with full length drop ladders properly located and adjusted.
5. In all shops which are not provided with automatic sprinklers, there should be kept a sufficient number of chemical extinguishers, or a sufficient number of fire buckets properly located and filled.
6. Special caretakers to be appointed in each shop for the care of the fire buckets, and for their use in case of fire.
7. All openings and exits to fire-escapes to be left unobstructed by tables, machines, boxes, partitions, and iron bars.
8. No doors to be locked during working hours.
9. No smoking to be permitted in workshop.
10. Conspicuous signs to be placed throughout the shop, marking location and direction of exits and fire-escapes.
11. Fire-proof receptacles, lined with tin, and having a tin cover, to be provided, in sufficient numbers, for rubbish.
12. Halls and stairways leading from shops to be adequately lighted by natural or artificial light.
13. Stairs to be provided with secure handrails and safe treads.
14. Sufficient window space to be provided for each shop so that all parts of the shop be well lighted during the hours from 9 A. M. to 4 P. M.
15. Where gas illumination is used, arc lights or incandescent mantles should be used.
16. All lights to be well shaded, to be placed above operatives, and not too near them.
17. At least 400 cubic feet of space, exclusive of bulky furniture and materials, should be provided for every person within the shop.
18. The shop should be thoroughly aired before and after work hours, and during lunch hour, by opening windows and doors.
19. No coal should be used for direct heating of irons, and whenever stoves are used for heating shops, they should be surrounded by metal sheet at least five feet high.
20. Walls and ceilings of shops and water-closet apartments should be cleaned as often as necessary, and kept clean.
21. Floors of shops, and of water-closet apartments, to be scrubbed weekly, swept daily, and kept free of refuse.
22. A separate water-closet apartment shall be provided for each sex, with solid partitions to extend from floor to ceiling, and with separate vestibules and doors.
23. Water-closets to be adequately flushed and kept clean.
24. A special caretaker to be designated by the employer to the care of the shop and water-closet apartments.
25. A sufficient number of water-supplied wash-basins, to be provided, in convenient and light locations within the shop.
26. Suitable hangers should be provided for the street clothes of the employees, and separate dressing-rooms to be provided wherever women are working.
27. Water-closet apartments, dressing-rooms, wash-rooms, and lunch-rooms to be properly lighted, illuminated, ventilated, cleaned and kept clean.
28. All seats to have backs.

FRESH AIR AS A SPEED BOSS

C. E. A. Winslow, Associate Professor of Biology, College of the City of New York

Townsend, Grace & Company built a straw hat factory without ventilating apparatus. The first two winters after occupation the sick rate was twenty-seven and one-half per cent. A ventilating system was then installed, after which the winter sick rate fell to seven per cent. It was claimed that the ventilating system paid for itself in one year.

In every factory, there is a type of machine, the living machine, which is extraordinarily responsive to slight changes in the conditions that surround it. These conditions, in this relation, we habitually neglect.

I am not dealing now with the sociological and humanitarian aspects of the case. I am quite frankly and coldly, for the moment, treating the operative as a factor in production whose efficiency should be raised to the highest pitch, for his own sake, for that of his employer and for the welfare of the community at large.

The intimate relation between the conditions which surround the living machine and its efficiency are matters of common experience with us all. Contrast your feelings and your effectiveness on a close, hot, muggy day in August and on a cool, brisk, bright October morning. Many a factory operative is kept at the August level by an August atmosphere all through the winter months. He works listlessly, he half accomplishes his task, he breaks and wastes the property and the material entrusted to his care.

If he works by the day the loss to the employer is direct; if he works by the piece the burden of interest on extra machinery has just as truly to be borne. At the close of the day the operative passes from an over-crowded, over-heated workroom into the chill night air. His vitality lowered by the atmosphere in which he has lived, he falls a prey to minor illness, cold and grip, and the disturbing effect of absences is added to inefficiency. Back of it all lurks tuberculosis, the great social and industrial disease which lays its heavy death tax upon the whole community after the industry has borne its more direct penalty of subnormal vitality and actual illness.

The remedy for all this is not simply ventilation in the ordinary sense in which we have come to understand the term. Ventilation should mean more than replacing foul air by fresh. It should mean the condition of the air of any enclosed space to the best requirements of the occupants of that space. Conditioning of the air so that the human machine may work under the most favorable conditions—this is one of the chief elements of industrial efficiency as it is of individual health and happiness. The chief factors in air conditioning for the living machine, the factors which in most cases far outweigh all others put together, are the temperature and humidity of the air. In many a plant money has been spent for an elaborate system of ventilation and if the air has been too hot or too dry or too moist the effect on comfort and efficiency has been worse than nil. It is a curious instance of the way in which we neglect the obvious practical things and attend to remote and theoretical ones, that for years more attention has been bestowed on the testing of air for carbon dioxide which was supposed to indicate some mysterious danger than on the actual concrete effect of overheating.

Heat, and particularly heat combined with excessive humidity, is the one condition in air that has been proved beyond a doubt to be universally a cause of discomfort, inefficiency and disease. Flugge and his pupils in

(Republished by permission from the July number of "Factory.")

Germany and Haldane in England have shown that when the temperature rises to eighty degrees with moderate humidity or much above seventy degrees with high humidity, depression, headache, dizziness and the other symptoms associated with badly ventilated rooms begin to manifest themselves. At seventy-eight degrees with saturated air Haldane found that the temperature of the body itself began to rise. The wonderful heat regulating mechanism which enables us to adjust ourselves to our environment had broken down and an actual state of fever had set in. Overheating and excess of moisture is the very worst condition existing in the atmosphere and the very commonest.

The importance of the chemical impurities in the air has dwindled rapidly with the investigations of recent years. The common index of vitiation due either to human beings or to lighting and heating appliances is carbon dioxide; but carbon dioxide in itself has no harmful effects in tenfold the concentration it ever reaches in ordinary factory air. Nor is there any reduction of oxygen which has any physiological significance. It was long believed that the carbon dioxide was an index of some subtle and mysterious "crowd poison" or "morbific matter." All attempts to prove the existence of such poisons have incontinently failed. There are very perceptible odors in an ill-ventilated room due to decomposing organic matter on the bodies, in the mouths and on the clothes of the occupants. These odors may exert an unfavorable psychical effect upon the sensitively organized, but as a rule they are not noticed by those in the room, but only by those who enter it from a fresher atmosphere. Careful laboratory experiments have quite failed to demonstrate any unfavorable effects from re-breathed air if the surrounding temperature is kept at a proper level.*

The main point in air conditioning is the maintenance of a low temperature and of a humidity not too excessive. For maximum efficiency the temperature should never pass over 70 degrees F. and the humidity should not be above seventy per cent. of saturation. At the same time a too low humidity should also be avoided. We have little exact information upon this point but it is a matter of common knowledge with many persons that very dry air, especially at seventy degrees or over, is excessively stimulating and produces nervousness and discomfort. It would probably be desirable to keep the relative humidity between sixty and seventy per cent.

Another point which may be emphasized in the light of current opinion is the importance of "perflation" or the flushing out of a room at intervals with vigorous drafts of fresh, cool air. Where there are no air currents the hot, moist, vitiated air from the body clings round us like an "aerial blanket" and each of us is surrounded by a zone of concentrated discomfort. The delightful sensation of walking or riding against a wind is largely perhaps due to the dispersion of this foul envelope and it is important that a fresh blast of air should sometimes blow over the body in order to produce a similar effect. The same process will scatter the odors which have been noted as unpleasant and to some persons potentially injurious. The principal value of the carbon dioxide test today lies in the fact that under ordinary conditions high carbon dioxide indicates that there are no air currents changing the atmosphere about the bodies of the occupants.

There is one other problem of atmospheric pollution to which special reference should be made. The presence of noxious fumes and still more the presence of fine inorganic or organic dust in the air constitutes a grave menace to health in many processes and is an important contributory cause of tuberculosis.

* This statement specifies laboratory experiments only and does not permit unwarranted general inferences. Editor.

Why Dust Collectors are Particularly Required on Grinding Machinery

The body of the normal workman has its "fighting edge" and can protect itself against the tubercle bacillus if given a fair chance but the lung tissue which is lacerated by sharp particles of granite or steel quickly succumbs to the bacterial invader. In dusty trades like stone cutting and cutlery working and emery grinding seventy-five per cent, of all deaths among operatives is often due to tuberculosis, against twenty-five per cent. for the normal adult population. This may be fairly interpreted as meaning that the actual death rate from tuberculosis in these trades is from two to four times as high as in a corresponding average population; in other words, three or four or five out of a thousand of these workers are sacrificed every year to the conditions under which they labor. The elimination of the dust by special hoods and fans is imperative in such industries and must be supplemented in extreme cases by the compulsory use of respirators.

It is extraordinary how little is known today of the actual conditions of factory air, either by manufacturers or by sanitariums. So far as I am aware the New York department of labor is the only state department dealing with factory inspection which collects and publishes exact data in regard to the quality of the atmosphere in the workshops. If the conditions indicated in these reports by Dr. C. T. Graham Rogers are typical, and there is no reason to doubt that they are, for the smaller industries at least, there is urgent need for betterment. The table below shows that of two hundred and fifteen work rooms inspected, one hundred fifty-six, or seventy-three per cent., had a temperature of over seventy-two degrees, and sixty-three, or twenty-nine per cent., exceeded seventy-nine degrees. Relative humidity exceeded seventy per cent. in thirty-nine, or eighteen per cent. of the workrooms. In tabulating these analyses I have excluded all cases where the outdoor temperature was over seventy degrees.

Temperature and Humidity in New York Factories.

(Report of the Commissioner of Labor for 1908, 1909 and 1910.)

	No. of Workrooms with Temperature			Relative Humidity
Industry	72° or less	73°-79°	80° or over	Over 70%
Printing	2	25	29	3
Clothing trades..	9	23	7	6
Bakeries	1	20	15	7
Pearl button mfg.	33	9	0	14
Cigar making....	8	4	5	7
Laundries	0	7	7	1
Miscellaneous ...	6	5	0	1
Total	59	93	63	39

In Massachusetts quantitative data of this kind is lacking, but the general results of inspections by the State Board of Health indicate similar conditions. In the report on the sanitary conditions of factories and workshops made by the Massachusetts State Board of Health in 1907, is the following comment upon the boot and shoe industry:

"In the majority of factories visited, the ventilation was found to be poor, and in many of them distinctly bad. Of the rooms not especially dusty, one hundred and two were badly ventilated and twenty-six were overcrowded. In the rooms in which large amounts of dusts are evolved, the number of machines with means for efficient or fairly efficient removal of dust was found to be 1,630; the number either inefficiently equipped or devoid of equipment was 2,769.

"Of eighty-four of the many dusty rooms reported, forty were also

overcrowded, thirty-five were dark, twenty-one were overheated, and eighteen were overcrowded, dark and overheated. In more than one-third of the factories visited, the conditions of waterclosets were not commendable, most of them were dark and dirty to very dirty."

There is plenty of evidence, though of a scattered and ill digested sort, that the elimination of such conditions as these brings a direct return in increased efficiency of production. The classic case of the United States Pension Bureau is always quoted in this connection. The removal of the offices of the department from scattered and poorly ventilated buildings to new and well ventilated quarters reduced the number of days of absence due to illness from 18,736, in the neighborhood of which figure it had been for several successive years, to 10,114.

D. D. Kimball cites a number of very similar cases in a paper on Ventilation and Public Health published in the Annals of the American Academy of Political and Social Science for March, 1911, the most striking of which are as follows:

"The Germania Insurance Company of New York, in 1910, had eighty clerks in one office. Previous to the proper ventilation thereof, ten per cent. were absent on account of illness all the while. Since then, the number of absentees has been reduced practically to nothing."

The vice-president of the Manhattan Trust Company states that by proper ventilation he has so increased the efficiency of his clerical force that he has been able to reduce the number of employees four per cent.

In one printing establishment in New York, a ventilation system was installed because of the insistence of the State Department of Labor that the law be complied with, the order having been resisted for two years. After the system had been in use a year the proprietor said that had he known in advance of the results to be obtained no order would have been necessary to have brought about the installation. Whereas formerly the men had left work on busy days in an exhausted condition and sickness was common, now the men left work on all days in an entirely different condition, and sickness had been very much reduced. The errors in typesetting and time required for making corrections were greatly reduced.

It is much to be desired that this problem should be studied by careful quantitative methods as a definite factor in the profit and loss account. The National Electric Lamp Association is approaching the question of sanitary conditions in this manner, comparing in detail the temperature and humidity of its workrooms with the hours of work, the pay and the efficiency of its employees. Only by such systematic study can it be determined how much factory sanitation is really worth in any given case. The evidence is already strong enough, however, to warrant some investigation. In cases where preliminary study shows its value, why should not the sanitary inspection of a factory be made part of its routine operation just as supervision of its mechanical features is a part of its organization today? It is not solely or chiefly the problems of ventilation as ordinarily understood that should be studied; and it must be remembered that there is never anything magical in a "ventilating system."

Temperature and humidity come first and foremost and dust and fumes must be guarded against in certain processes. The cleanliness of the factory, the purity of drinking water, the quality of lighting, the sanitary provisions and a dozen other points will suggest themselves to the skilled investigator when on the ground.

REPORT OF THE PUBLIC POLICY COMMITTEE OF THE NATIONAL ELECTRIC LIGHT ASSOCIATION

To an astonishing degree, both in scope and rapidity of development, questions pertaining to the environment of our working classes are now absorbing public attention. This interest extends to their health, material welfare, and, to a certain degree, to their happiness. The right solution of these questions, in which your Committee feels the electrical industry should take a leading part, will do much to eliminate unfortunate differences which may occur between capital and labor. We have a large and reciprocal interest in all things tending toward the social and material improvement of the communities we are endeavoring to serve.

You need not be reminded that in the past our Association has given a great deal of consideration to these questions. The meetings of your Committee have been occupied with many other matters, to which we understand reference will be made in the President's address, but feeling that this subject is of immediate and pressing interest and importance to our members and to the public, we have decided to devote to it the entire report of this year.

The Value of Labor

Undoubtedly modern industry on a large scale depends upon three factors—(a) Capital; (b) Direction, executive and administrative; (c) Labor. All combined and working in harmony are so essential that a partial or dwarfed interest in any one factor would invite absolute failure, or at best make possible only partial success. Neither the interest of (a) Capital nor that of (b) Direction has been considered by your Committee, excepting in so far as either is conserved by an equitable interest in the welfare of (c) Labor. Nor have we attempted to pass upon the question of wages, other than to express the belief that in the same locality they should be fully equal to those paid by any other employer engaged in similar work. Wages are a local and independent question and in this respect, so far as our knowledge goes, the employees of our industry are treated very generously.

Rather have we been concerned with such questions as those which follow:

(a) Are our employees, individually or collectively, receiving all of the results of their labor to which they may be properly entitled?

(b) Are they adequately compensated in the event of industrial sickness or accident? Do we appreciate and fairly assume the responsibility—moral if not technical—sometimes resting upon us to restore an injured employee to health, or in the event of a fatal accident to provide adequately for his dependents?

(c) Do we take sufficient interest in the welfare of our employees when, owing to conditions beyond their control, such as serious sickness, they are in distress and possibly subjected to want and deprivation?

(d) Are there any available means other than those now employed by which the efficiency of labor can be fairly increased?

(e) Can the differences between labor and capital be lessened or removed without decreasing the efficiency of labor?

Sound Economy and Humanity—Both

Believing that anything accomplished in the solution of these questions possesses elements of sound economy as well as of humanity, we realize that our conclusions may not apply with equal appropriateness to all members. We are mindful that differences may exist in different communities, not alone regarding financial resources, and the personality of the employees, but in public sentiment. What one may find practicable and profitable, another—equally anxious to accord fairest treatment, and no less mindful of public interest—may find impracticable or impossible of accomplishment.

Upon these questions wide differences of opinion naturally exist. This was originally true in your Committee. Consultation with various authorities, consideration of available statistics, and the experience of others, have enabled us, however, to reach a common and unanimous conclusion. The adoption of the suggestions of this report, therefore, must depend upon the judgment of our members individually.

The Term "Pension" is Inadequate

By unanimous vote, the term Pension, as being inadequate or subject to wrong interpretation, has been eliminated. We recommend as a substitute "Service Annuity." Our opinion is that the latter is to be paid as a form of compensation for a definite service that cannot be rightly included within ordinary wages. It is compensation for continuous service over a period of several years and is to be paid upon carefully pre-arranged and understood conditions.

Wages

As a term employed in this report wages is inclusive of both wages and salaries, for in the last analysis the latter is also a wage for a given service. Wages are the sum paid for a given work and should be the same in a corporation whose relations with its employees go far beyond any legal requirements, or with one which does nothing more than meet its technical obligations, or by a private employer. Any contribution for the improvement of an employee's surroundings or of himself should not be construed as affecting his wage in the slightest degree.

Neither Charity nor Philanthropy

Your Committee feels it important that all suggestion of charity or philanthropy should be entirely eliminated in the establishment of relations between employees and their employers. It is urged that these several forms of relationship be adopted in the sense that the employees are to get only that which they earn; that what they receive is the result of rendering service as well as of performing work—oftentimes two entirely different phases of industrial employment.

Were a word of explanation needed, it might be pointed out that an employee performs his technical task for a definite wage; in addition he can, and often does, render his employer service by working continuously and in exercising a degree of devotion which affects not only his own work, but that of all other employees associated with him. Thus in continuous service, with other advantages, we have enhanced efficiency; with increased devotion to his employer "soldiering" becomes lessened or eliminated; in a more careful utilization of tools and materials still other economies and efficiency may be expected.

It is to secure this added service that your Committee has endeavored to find a form of compensation reasonable and mutually satisfactory. This it believes has been accomplished in the recommendations of this report: further, that in this—(a) there will be inevitably larger resultant efficiency and economy, though not necessarily apparent statistically; and (b) that expenditures devoted to these purposes are justified as elements in the cost of service, and would be so considered by Legislative Authorities, Public Service Commissions or others passing authoritatively upon the subject.

Recommendations to Members Adopting the Report

The suggested forms of relationship include:

I Accident Insurance
II Sickness Insurance and Death Benefits
III Service Annuities
IV Profit Sharing
V Employees' Savings and Investment Funds
VI Life Insurance

I Accident Insurance

Your Committee believes that the cost of all accidents inherent to our industry should fall, not upon the individual employee or his dependents, but upon the industry as a whole. It, therefore, recommends:

(a) That when an accident occurs which is clearly without deliberate misconduct, gross carelessness or reckless disregard of consequences on the part of the employee, the entire cost should be borne by his employer, who should assume full responsibility for restoring the injured employee to health as rapidly as possible.

(b) That full wages should be continued during illness and convalescence for a period of six months, and at the expiration of six months the wages should be continued at one-half the full wages, for life or during disability, unless the "Service Annuity" to which the employee would be entitled in case of retirement should exceed one-half the wages, in which case the employee would be entitled to the "Service Annuity."

(c) That in the event of partial disability proportional payments should be made to make up, either wholly or partly, the employee's decreased earning capacity, if there be any.

(d) That in the event of death from accident within the service the payment to which the employee would be entitled in the event of total disability shall be continued:

(1) To his dependents, should there be any, during the employee's expectation of life, under the assumptions of the American Experience Table of Mortality, or

(2) Until a widow should again marry, or dependent children reach the age of sixteen years, or to other dependents such as a father or mother while they live, with such other provisions as may be applicable in individual cases, but in no event to exceed the deceased's expectation of life, under the Experience Table.

II Sickness Insurance and Death Benefits

This is a kind of relationship which has no connection with industrial accidents or industrial sickness; of the lat-

ter, however, there is practically none in this industry. Many of our members have established associations of this character. Where such organizations do not exist, your Committee believes it desirable:

(a) To organize and, subject to local conditions, to contribute where necessary to employees' co-operative benefit associations.

(b) To encourage their harmonious and successful development in every practical way.

(c) It is estimated that, assisted by the employing company, co-operative associations can contribute approximately fifty per cent of the employee's wages when sick, at a cost of approximately one per cent of his wages; likewise, that a death benefit of from $300 to $500 can be paid with a weekly contribution ranging from ten cents to fifteen cents.

In this your Committee omits all detail, realizing that our members have had a great deal of experience and believing that it is better for these associations to be organized and conducted, so far as practical, by the employees, in co-operation with the company and the policy that guides its affairs.

III Service Annuities

Your Committee is of the opinion that our member-companies should provide a Service Annuity for every permanent male employee who reaches the age of 65 years, and for every female employee of 60 years, having a continuous and satisfactory record of ten years of service. In this connection, we desire to offer the following recommendations:

(a) That the entire cost of Service Annuities should be contributed by the company as part of the annual cost of labor.

(b) That this is to be the compensation to which the employee is entitled, in addition to his wages, for rendering continuous and satisfactory service throughout his term of employment.

(c) Should the continuity of the term be broken by the employee of his own volition, the obligation to pay the Service Annuity would cease. The term, both in reference to the minimum period at which the Service Annuity can begin and the percentage upon which the amount shall be based, must then begin with renewed or reinstated service.

(d) The possible exception to this rule is where the employees are laid off temporarily through no fault of their own. Your Committee suggests that if this is done by the company, an employee's service, when not less than nine months yearly, shall be treated additively in determining the Service Annuity. Likewise, it is suggested that if employees are temporarily laid off because, say, of the destruction of the power plant, or for similar cause, this should not be considered as an interruption in the continuity of service.

The point is emphasized that the service of the employee is discontinued through no fault of his own, but for economic reasons within the company.

(e) That any employee having a minimum record of ten years of continuous and satisfactory service, and who in the opinion of the company has become unfitted for duty, may be retired at any age and given a Service Annuity; that any such employee may make application for retirement, or that the recommendation may be made by his employing officer.

(f) The suggested basis of Service Annuities is from one to two per cent of the yearly wages, as may be adopted by the company, for each year of continuous service, based upon the employee's wages during the highest ten consecutive years of employment.

IV Profit Sharing

The adoption of the principle of Profit Sharing by our members is offered as a means for establishing closer, more efficient and more satisfactory relations with our employees.

The following suggestions are offered:

(a) That the justification for Profit Sharing is to secure and pay for service of fidelity and efficiency.

(b) That the object is to secure partner instead of employee service; to have our fellow workers partners instead of employees, in the accepted sense of the term.

(c) That the compensation paid to employees in the form of Profit Sharing should be considered no part of the ordinary wage schedule.

(d) That ordinary Profit Sharing should preferably not be paid immediately in cash; local conditions may control this general rule, and at times special reasons may make payments in cash desirable, as for example:

(1) The purchase of a home.

(2) Special circumstances which, in the judgment of those in control of the matter, justify cash payments.

(e) That preferably the profits of the employee should reach him in the securities of the company; or in the case of a subordinate company, the securities of the parent company.

(f) That securities for distribution, in other than special instances, should be secured at the best terms and wher-

ever obtainable; employee security holders would necessarily bear any reduction and receive the benefit of any advance in values or the rate of income paid.

(g) That dividends upon securities acquired through Profit Sharing should be paid in cash in the manner customary to other security holders, and available for any purpose desired by the recipient.

(h) Your Committee emphasizes that one object of Profit Sharing is to have every employee also an owner. If he does not receive securities, this ownership interest may not follow; or if after receiving the securities, he sells them his lasting interest is not secured.

(i) Your Committee recognizes that this feature of its plan calls for the largest contribution required in this movement; on the other hand, the economic results promise to be most important and satisfactory in

(1) More efficient and permanent service;

(2) A tendency greatly to improve the relations between the companies and their employees;

(3) The creation of a large number of security holders from the body of employees who will thus have a double interest in the welfare and success of the property.

(j) In the distribution of the results of Profit Sharing, your Committee desires to impartially suggest two plans, leaving the adoption of either to the judgment of the individual member:

(1) Restricting the sharing of profits to employees who, in the judgment of those to whom they are subordinate, render specially efficient service. This means that those who are to become participants in Profit Sharing must be carefully selected from year to year from the employee forces;

(2) Sharing profits alike with all employees having a minimum period of service, say, of one or two full calendar years, excepting under very special circumstances.

(k) Some favor giving at once the maximum amount to all who are entitled to it; others favor increasing the amount with the service, giving the maximum only after several years have elapsed. The latter method places an added premium upon long service, but between the two methods, the Committee makes no recommendation, believing that this is a local matter.

(l) Your Committee believes that in sharing profits with employees a dividend should be declared annually which bears a fair relation to the income paid to the security holders; we believe that there should be definite relation between the securities and the labor dividend.

V Employees' Savings and Investment Funds

It is evident to your Committee that in view of the experience of some of our Member-Companies, a material benefit can be obtained by establishing Employees' Savings and Investment Funds. Possibly this should be divided into two classes. The first would be simply a Savings Fund to encourage thrift amongst employees, under which the deposits would be guaranteed by the Company and more than the ordinary savings bank rates of interest could usually be paid.

Savings Funds

For Savings Funds your Committee makes the following recommendations:

(a) That the security and safe return of the funds be guaranteed by the Company.

(b) That every convenience be afforded employees to make their deposits.

(c) That deposits be made directly by the employee, rather than that the Company, under other than special conditions, take them from his wages.

(d) That to encourage thrift where deposits are permitted to remain for a definite period, the Company might guarantee something more than the savings bank rate of interest; that where left for less than a definite period they may be withdrawn under substantially the conditions that apply to savings bank deposits.

Investment Funds

The second suggestion is that an Investment Fund for the employees might be organized with the understanding that the funds shall be invested only in the Company's securities. This might be combined with Profit Sharing and the two work very satisfactorily together.

For an employees' Investment Fund our recommendations follow:

(a) That the Company should assume full responsibility for receiving and accounting for the funds.

(b) That the responsibility for the investment of these funds should rest solely upon the Trustees and members of the Investment Fund.

(c) That the securities of the Fund should be purchased at the best prices obtainable.

(d) That the members should understand that the result of their investment might be either a profit or a loss,

exactly as these possibilities rest upon every other investor in public service securities.

(e) That every convenience should be afforded for receiving the deposits of the members of the Investment Fund; your Committee thinks it undesirable for the Company to make deductions from its employees' wages, excepting under other than very special circumstances; rather should the money be paid directly by the employee to the accredited fiscal officer of the Investment Fund.

VI Life Insurance

It is suggested that our members take the initiative in providing their employees with all possible information in connection with safe, low cost life insurance, but that such insurance should be at the sole cost of the employees.

In Conclusion

Your Committee recommends that any plan adopted for improving the relations between employees and our member-companies shall include every employee and officer from the office boy to the president, inclusively.

Several of the members of our Association have already adopted some of the recommendations of this report. Should any information be desired upon the methods followed or the results accomplished, the Secretary of the Association will be glad, upon request, to furnish any information in his possession.

In the hope that this report may be of some practical value to our members and their employees, it is respectfully submitted by

Charles L. Edgar, Chairman
Nicholas F. Brady
Everett W. Burdett
H. M. Byllesby
W. H. Blood, Jr.
Henry L. Doherty
W. W. Freeman, ex-Officio
George H. Harries
R. S. Hale
Samuel Insull
Joseph B. McCall
Thomas E. Murray
Samuel Scovil
Arthur Williams, Vice-Chairman

NEW FIRE DAMP DETECTOR

Consul General John P. Bray, Sydney, Australia, reports that a new device for detecting fire damp in mines has just been invented by two young chemists, junior teachers in the Technical College in that city.

The new detector is a simple and portable bit of apparatus, designed for the purpose of detecting and indicating the presence of fire damp and other dangerous gases in coal and other mines. Its warning is given either by a loud-sounding alarm bell, or by the flashing into view of a red glow light. The makers of this simple contrivance have based their procedure upon Graham's law of the diffusion of gases, viz, "all gases tend to diffuse into one another at a definite rate, which varies in an inverse ratio to the square root of the density of the gases." Taking also Ansell's fire-damp detector as an additional starting point, the inventors have succeeded in procuring an efficient instrument which an inspector or miner may carry in his hand and test with ease and certainty the air in any heading or at any working face.

The apparatus consists of merely a piece of glass tubing bent into **U** shape, with the lower curve flattened. One leg of the **U** has an ordinary "shell" funnel at its upper end, and the open mouth of this is covered by a thin disk of plaster of Paris, mixed thin, so that in drying it remains porous. The other leg is crowned by a small reservoir containing additional mercury, with a little glass tap to allow the metal to be run into the bent tube below as and when required. Through each lower leg there is passed a fine platinum wire, that of the funnel-crowned one being about half an inch below the level of the other, and immersed in mercury, which fills the bend of the **U** up to this level. Each wire is connected to the poles of an ordinary battery cell, and thence effective connection is made with either alarm bell or colored light.

What happens when the detector is brought into the presence of an admixture of gas and air is simply this: The foreign gas permeates the plaster of Paris seal and depresses the mercury column below. This naturally causes the mercury in the other leg of the **U** to rise and its rise brings it into contact with the platinum wire just above it. This light contact is sufficient to complete the circuit, and set either bell or danger light to work. So sensitive is the apparatus that, as shown by tests during the recent exhibition, it can be adjusted to give warning of the presence of such a small proportion as 2 per cent, or even less, of an undesirable gas.

NATIONAL CONFERENCE OF CHARITIES AND CORRECTIONS

In the Light of Its Constructive Suggestions Along Lines of Industrial Betterment

MARIE VIRGINIA SMITH

The thirty-eighth National Conference of Charities and Corrections met in Boston June 7-14, 1911. Nine committees had in charge a program of widely differing subjects—subjects which might appear unconnected to an age less advanced than the present. The scope of the program and the trend of the discussions were evidences of a thorough recognition that all social questions are interrelated.

In the words of Mrs. Florence Kelley, Chairman of the Committee on Standards of Living and Labor, the program of its section "was arranged with a view to shedding light from many directions upon the undue burden which industry now places upon charity," a second object being "to indicate the next steps to be taken toward lifting that burden by correcting bad industrial conditions."

The discussions of the section were opened by the Committee's report of approval on "Minimum Wage Boards," read by the Chairman. Louis D. Brandeis in an address entitled "Workingmen's Insurance: the Road to Social Efficiency," compelled consideration of the workman's financial dependence. The measures to secure industrial freedom for employees proposed by Mr. Brandeis form the most valuable contribution made to the work of the section. The subject was important and the suggestions original and constructive.

Miss Jane Addams, speaking at the same general session on the subject of "Standards of Education for Industrial Life," plead for the conservation of the child through education suited to his needs. She recommended the plan of co-operative education developed by the University of Cincinnati.

Paul U. Kellogg, Assistant Editor of *The Survey,* again advocated the academic proposition of the protection of American labor through the establishment by the federal government of a high minimum wage for alien labor.

Miss Josephine Goldmark, Publication Secretary of the National Consumers' League, in her paper on "Standard Working Hours," read during the discussion of Women in Industry, was convincing in her statements of the need for further regulation of women's hours of work.

At the section's meeting on "Safety," David S. Byer, Chief Safety Inspector of the American Steel and Wire Co., Pittsburg, gave detailed accounts of the schemes for human conservation occupying the attention of concerns employing large numbers of laborers. Peter Joseph McKeon made specific and somewhat technical recommendations in regard to "Standards of Safety in Relation to Fire in Factories." Dr. Alice Hamilton's account of her work for the Illinois Commission for the Investigation of Occupational Diseases was a revelation of American lack of information on this subject and sounded a call to action.

In a keen and vigorous address on "Our Social Program," Dr. Edward T. Devine, Editor of *The Survey,* laid stress on such economic and industrial features as the prevention of diseases and accidents, preservation of reasonable standards of living, the establishment of occupational standards, and attention to the physical needs of childhood by total prohibition of child labor

for wages. In this connection he suggested an amendment of the federal constitution providing that Congress have power to determine conditions of the wage contract with a view to health and safety, to regulate or prohibit the employment of children in any industry, to protect workers in such employments as are dangerous, and to make provision for compensation by insurance or otherwise to persons injured by accidents.

Employers and employed would have rightly chosen the deliberations of the Committee on Standards of Living and Labor as establishing their closest contact with the Conference, but would have been wrong in considering that this section alone could make specific contributions to the solving of their problems. What more vitally affect economic and industrial efficiency than Housing, Health and Recreation? The employer foresees his increasing need at many points of the assistance of social workers. Is not their securing and training then a matter for his attention? Might not an increased productive capacity among his employees be a result of "An Educative Campaign for the Prevention of Drunkenness"? What could be of greater importance to industry than that today, its recruits in the next decade—the children of today—should possess soundness of body? Medical Inspection of Schools and instruction in Sex Hygiene largely contribute to such a condition. Again, is not the industrial army interested in an awakening of the church to its social responsibilities that it may receive effective leadership therefrom?

Industrial Service or Welfare Work is a part of the social field little explored. Service workers in large and small industrial plants over the country were present at all the meetings—eager seekers for truths applicable to the solving of their peculiar problems. A criticism of the work by the workers was that it could be made more effective if more authority were vested in service departments by employers. It was claimed that the character of service activities is rapidly changing, that it is becoming more fundamental, more comprehensive; that the day when the establishing of lunch and rest rooms was considered the fulfillment of a service department's function is past. Beginnings of increase in powers were noted in the delegated to service managers of hiring and discharging help and of the control of sanitation. It was insisted that with a keener vision of the possible scope of the work is coming a deeper sense of responsibility and better training, which would warrant larger power.

Through the efforts of Mr. E. E. Pratt of the New York School of Philanthropy and Miss Mina S. Hanau, conference workers particularly interested in service work, held several profitable gatherings. A public meeting, presided over by Owen R. Lovejoy, was addressed upon the general subject of "Industrial Betterment Work" by Mr. Pratt and upon "Vocational Guidance" by Mr. Meyer Bloomfield, of the Boston Bureau of Vocational Guidance. Mr. Royce W. Gilbert, Sanitary Engineer, spoke of his investigations of air conditions in factories as related to human efficiency.

The next National Conference of Charities and Corrections will be held at Cleveland in June, 1912. Employers and employed could benefit much by attendance upon this body and more by participation in its discussions.

AN INNOVATION IN BRITISH WAGE SCALES

CONSUL ALBERT HALSTEAD, Birmingham, Consular and Trade Reports.

The Brassmasters' Association and the National Society of Brassworkers and Metal Mechanics have supported the unanimous decision of a British conciliation board selected to settle a dispute as to wages. A new rate of wages has become operative under which workers will be graded according to their qualifications and capacity.

This method of grading the wages of workmen is wholly new in the relations between employees and employers in the United Kingdom. As the scheme becomes operative there will be an incentive to workmen to do the best they can with a view to improving their own wages and consequently their own condition. When contrasted with the prejudice which prevails in some trades against a bright workman working to the total of his capacity, this innovation is quite notable.

Workmen Graded According to Ability.

The rates of wages to be paid brass workers according to the grade in which they are placed will be the minimum, and, I understand, the wages will advance with the qualifications and capacity shown by the workmen in each grade. The rates of wages are not yet made public, but the grades of workmen are announced. Full opportunity will be afforded workmen to prove their qualifications and ability.

The arrangement is the outcome of long negotiations between workmen and employers resulting from the activity of the secretary of the brass workers' organization against alleged sweating in the brass trade. A conciliation board of thirty-two members comprising equal numbers representing the brass workers and the employers, was appointed. The brass workers proposed a schedule of wages which did not meet with the approval of the employers, who proposed as an alternative a system of grading, which, after full discussion and some modification, was agreed upon unanimously by the conciliation board. The unanimity of the agreement is a most encouraging feature at a time when there has been marked unrest in labor circles throughout the United Kingdom.

What it is Hoped to Accomplish.

The agreement, it is stated, advances wages over those at present paid, and it is intended to absolutely do away with sweating in the brass trade. At the same time it is hoped to result in a much closer relationship between the brass-trades schools of the district, which is the center of the brass trade of the United Kingdom, the employers and the workmen, and it is hoped that it will also result in such improvement of the quality and character of the work as to materially strengthen the trade.

According to the agreement there are five grades of workmen to be provided for, and each grade is to be denoted by different colored adhesive stamps to be affixed to a membership card. (The grades are as follows:

A. Improvers of 21 years of age.

B. (Green grade.) Qualifications: 21 years of age. Dressers who can turn, file over at the vice, and are used to tapping and plate screwing. Polishers who can rough, plain mop, and emery bob. Ordinary dippers and common bronzers. Common burnishers on lathe and vice.

C. (Brown grade.) Qualifications: 21 years of age. Dressers who can turn and screw inside and out, file flat and true at the vice. Polishers, colorers, and all-round roughers. All-round dippers and bronzers. Advanced burnishers on lathe and vice. Repairers and chasers.

D. (Blue grade.) Qualifications: 21 years of age. Dressers who can turn, screw inside and out, file square and flat at the vice, and finish own work throughout. Polishers who can do all processes and finish into lacquering room. Expert burnishers and pattern chasers. Art bronzers and colorers with a practical knowledge of the art of coloring.

E. (Red grade.) All previous qualifications plus capacity for working to scale drawings or blue prints or efficient pattern makers.)

How the Grades are Made.

It is arranged that the grade card shall be handed to the workman by the society and shall have provisions for his number at the factory at which he is employed, the name of the society, and his name and signature. These various grade cards are to be issued by the executive of the brass workers' society, but the employers shall have the right to challenge the qualifications of the holder of any ticket and require him to submit himself to an examination by the managers of the municipal brass-trades school in conjunction with representatives indicated, one by the association of employers and the other by the society of brass workers, who in no case shall be interested parties and

whose decision shall be final. If the decision is in favor of the workman, the employer is to pay a fee of 10s. ($2.43) to the municipal brass school.

Should the decision be adverse to the workman, the society shall have discretion to put such workman back one grade, but in either event the employer is not bound to reinstate the workman whose qualifications have been challenged. The examination is to include the various processes in the workman's particular branch of the trade, and the result of the examination is to be indorsed on the workman's card. If three adverse decisions are indorsed, the workman shall be put back one grade.

How Advances May be Secured.

When a workman has been duly graded by the society, he shall have the right to qualify for a grade higher by submitting himself to an examination by the authority constituted as mentioned above if required to do so by his employer. His work and capacity shall be examined in connection with a representative nominated by the association of employers and with one nominated by the society of workmen. If the decision is favorable to the workman, the employers are to pay a fee of 10s. ($2.43) to the municipal brass schools; if the decision is adverse the workman or his society is to pay the fee, and the workman is to remain at least six months in the same grade as he held before the examination. It is hoped that it may be arranged that the distribution of grade cards may be made the joint duty of the society and the managers of the municipal brass school.

(As to overtime are to continue in accordance with the award of the late Sir David Dale made December 10, 1900:)

Where workmen are desired by their employers to work more than 54 hours in any week, time and a quarter shall be paid for overtime to day workers, and in case of piece workers that the piece work earning shall be supplemented by a payment of one-fourth of what the workman would be rated at per hour if and when working by time.

One week's notice is given by either party to terminate an agreement whether the workman is working day or piece work and the notice is to be given at the end of the working week in each respective factory.

The task of grading the brass workers under the scheme arranged by the employers and workpeople as an outcome of the latter's agitation for increased wages in the lower branches of the industry is necessarily a protracted business, but freedom from friction has enabled excellent progress to be made, although a considerable time must yet elapse before the workpeople at every establishment are classified. Up to March 31 nearly 2,000 men had been graded, and of this total, 480 employees have received an increase in wages of 2½ per cent or less, 400 of between 2½ and 5 per cent, 600 of between 5 and 10 per cent, 245 of between 10 and 15 per cent, and 200 of between 15 and 25 per cent, while in a few cases the advance exceeds 25 per cent. The scheme has naturally had the effect of bringing many recruits to the trade-union, thus tending to secure greater uniformity in the trade in the matter of wages.

This would appear to indicate that the scheme has been very successful, particularly as it has raised the wages of such a large proportion of the brass workers.

INDUSTRIAL ACCIDENTS IN THE UNITED STATES.

The 1908 report of the Bureau of Labor showed the number of deaths due to the industrial accidents of the U. S. to be between 30,000 and 35,000 annually.

Mr. Calder has found "the chief causes to be ignorance, carelessness, unsuitable clothing, insufficient lighting, dirty and unobstructed work places, defects of machinery and structures, absence of safeguards—

"Accidents due to the culpable as well as excusable ignorance of supervisors, engineers, and millwrights, elevator men, and guardians of general facilities, are frequently very serious.

"The ragged sleeve ends, loose ties and open jackets of untidy operators are responsible for many accidents at machine parts which are necessarily exposed.

"Insufficient lighting is a cause of numerous accidents, particularly serious and fatal falls.

"Defects in machinery and structures are responsible for some accidents, but not for as many as are commonly supposed."

Mr. Calder goes on to say that the maintenance of strict discipline in the shops, the adoption of salutary punitive measures, the firm elimination of the dangerous employees in the shops, and a campaign of education through the plant will do much to lessen the number of accidents. The safety engineering is of importance and there should be a systematic and intelligent review of all the industrial equipment.

The mechanical engineer can also contribute to industrial safety by devising safe guards.

The machine-tool builder accomplishes a great deal in the safe guarding of machinery.

"In power houses the edges of all stairs, platforms, ladders, and gratings, should have low fenders of metal on both sides which will prevent nuts, bolts, tools, and other small parts, rolling off into the machinery or striking employees in their fall. The footing of the engine attendants is often slippery and insecure, this should be safeguarded."

The most serious injuries in connection with fixed structures inside plants occur in chemical and other works where large open receptacles for stock at a high temperature or chemically dangerous are in common use, and the processes are necessarily continued day and night.

Mr. Calder holds the best arrangement in such cases to be that where the top 3 feet of the vat or tank is used as a guard or fender, and the working platform is this distance below the edge or lip of the dangerous vessel. Gangways over tanks and vats should be doubled railed on each side and their efficient maintenance closely watched. It is well to round off the edges of open tanks or vessels, so they offer no foothold.

THE TRAINING TABLE.

Professor John R. Murlin, of Cornell University, points out some of the necessary qualities in the successful athlete which he thinks are just as necessary to the man in after life. The training table banishes the luxuries which tend toward physical incompetency and replaces them with wholesome muscle and brain building food

Here is a lesson for the wife and mother who should give the same study to the diet of her family that the physical director does to the diet of his athletes.

Professor Murlin also refers to the athlete's enthusiasm and eagerness to conform to all of the rules of discipline and co-operation in order to reach the highest attainable team work.

These same factors are essential in the organization and operation of all successful business enterprises.

KANEGAFUCHI SPINNING COMPANY (LTD.) OF JAPAN

The average daily wage paid to the 25,549 employees of the Kanegafuchi Spinning Company is 50 sen ($0.25) for males and 33 sen ($0.164) for females. All of the Kanegafuchi Spinning Co.'s mills are kept in a most sanitary and hygienic condition, most of them possessing such up-to-date institutions as hospitals, recreation halls, hygienic restaurants, mutual benefit societies, etc., the Hyogo mills even being provided with a pleasure resort for employees in broken health.

Current Review

AMERICAN MAGAZINE

April, May—Series of articles, entitled The Gospel of Efficiency, by Frederick W. Taylor. Published in book form by Harper & Brothers.

June—A Gospel of Efficiency.
A Criticism, Upton Sinclair.
A Reply, Frederick W. Taylor.

ASSOCIATION MONTHLY

June—The Association in Industry, Florence Simms.

AMERICAN MACHINIST

April 20—Looking for a Job, E. Q. Williams.

May 4—Factory Sanitation and Efficiency, C. E. A. Winslow.

Efficiency in Teaching Shop Work, C. A. Halfer.

Intensive Production and the Foreman, A. Hamilton Church.

A Broad View of Profitable Ethics, David Van Alstyne.

May 11—A Manager's View of the Taylor System, James R. Johnson.

May 25—The Training of Industrial Foremen, Charles Park.

Limit of Scientific Efficiency, Henry G. Bradlee.

June 29—The Suggestion Box, W. Smith, Birmingham, Eng.

AMERICAN INDUSTRIES

April—The eight hour law in New York, A. Parker Nevin.

June—The Continuation School in Industrial Education, H. E. Miles.

ARCHITECTURE AND BUILDING

April—Fire Protection of the Car House for the Second Avenue Railroad Company, New York. Maynicke and Franke, Architects.

BUSINESS AND THE BOOK-KEEPER

April—Making the Man fit the Plan. G. F. Stratton.

May—Getting the most out of Men, William Hamilton Burquest.

June—When you get a Raise, William Hamilton Burquest.

Laying out the Day's Work, Charles O'Malley.

CENTURY MAGAZINE

April—The Awakening of the American Business man. Second Paper: The Human Side of Scientific Management, Will Irwin.

May—The Awakening of the American Business Man. Third Paper: Industrial Indemnity, Will Irwin.

ENGINEERING MAGAZINE

April—The Ninth Principle of Efficiency, Harrington Emerson.

May—The Tenth Principle of Efficiency, Harrington Emerson.

June—The Eleventh Principle of Efficiency, Harrington Emerson.

EDITORIAL REVIEW

June—The "Loan Shark" and the Employee, Jacob Gimbel.

FORUM

April—The Protection of our "Infant Industry," Harry Albert Austin.

May—Wanted—Leisure, Temple Scott.

FACTORY

May—What More than Wages, F. W. Feiker.

HARPER'S WEEKLY

May 20—A Model Corporation — The United Shoe Machinery Company.

HEATING AND VENTILATING MAGAZINE

May—Air Conditioning in Industrial Work. I. Regulation of Humidity in Paper Mills, Alexander H. Twombly.

HAMPTON'S MAGAZINE

June—Deathproof versus Fireproof, Rheta Childe Dorr.

IRON AGE

April 6—The Westinghouse Apprenticeship System. How these Companies Train College Graduates for their Engineering Departments.

April 13—Mutuality, W. A. Grieves, Employment Supt. Jeffrey Mfg. Co., Columbus, Ohio.

April 20—Central Station Welfare Work. Plans for Benefit of Electric Light and Power Employees.

May 4—Steel Manufacturers Consider Welfare Work.

Right Principles in Works Management, Sterling H. Bunnell.

May 11—The Betterment of Steel Works Labor Conditions. Welfare Work. Discussed at Judge Gary's Dinner, May 4.

May 18—Accident Prevention in the Machine Shop, Henry M. Wood, Cincinnati, Ohio.

May 25—Welfare Work. Its Tendencies and Potential Results, Max H. C. Brombacher.

LESLIE'S WEEKLY

April 13—How to Eliminate the Fire Peril, Edward F. Croker.

McCLURE'S MAGAZINE

April—The Newark Factory Fire, Mary Alden Hopkins.

June—The Story of a Post Office Clerk, Charles W. Eliot.

MODERN METHODS

April—Employer and Employe, T. J. F. Pagels.

Glimpses into Business Places, Fred A. Hayner.

NATIONAL POST

May 6—Fire Peril in Factories, Anna Strunsky Walling.

OUTLOOK

April 15 — Cross-Lights and Counter-Claims, Washington Gladden.

May 20—The Story of the Consumers' League, Florence Lucas Sanville.

May 27—Wisconsin: An Object Lesson for the Rest of the Nation, Theodore Roosevelt.

June 10—The Road to Social Efficiency, Louis D. Brandeis.

June 17—The Man Farthest Down. Child Labor in the Sulphur Mines, Booker T. Washington.

SATURDAY EVENING POST

April 1—Training for Citizenship in Munich, Edwin G. Cooley.

The Conservation of Labor. As Demonstrated by the Workman, George Frederic Stratton.

April 15—The Conservation of Labor. As Demonstrated by the Employer, George Frederic Stratton.

May 27—A New Profession for the Young Man, Roger W. Babson.

SURVEY

April 1—A New Profit-Sharing Plan, John A. Fitch.

Minimum Wage Boards, A. N. Holcombe.

The Bituminous Coal Miner and Coke Worker of Western Pennsylvania, W. Jett Lauck

Industrial Survey of the Month, Graham Taylor.

Women and Children who make Men's Clothes, Mary Van Kleeck.

April 22—Seventh Annual Child Labor Conference, Samuel McCune Lindsay.

Organized Labor and Efficiency, Louis D. Brandeis.

April 29—Escape from Loft Buildings, H. F. J. Porter.

May 6—Factory Introspection, George M. Price, M. D.

Industrial Survey of the Month.

The Conservation of Life and Property in Mines, Graham Taylor.

May 20—

Wisconsin Plans for the Extension of Industrial and Agricultural Education, Warren Dunham Foster.

Labor Legislation, John B. Andrews.

June 10—Illinois Child Labor Law, Florence Kelley.

June 17—Labor Legislation, John B. Andrews.

WORLD TODAY

April—Brightening the Life of the Toiler, Edward A. Halsey.

Caring for the Southern Mill Operatives, Sloan Duncan Watkins.

WORLD'S WORK

April—Half Time at School and Half Time at Work, Frank Parker

Human Engineering

WINTHROP TALBOT, M. D., Editor

A Magazine for Employers published to provide a means of exchanging Experiences on the Human side of Industry and a Forum for the discussion of the Conservation of Human Energy

PUBLISHED QUARTERLY

Subscriptions Should be Sent to Human Engineering, Station B, Cleveland

RATES

One Dollar a Year Twenty-five Cents a Copy

Volume I **Number 4**

CONTENTS

		PAGE
EDITORIAL		190
BUREAU OF INDUSTRIAL SERVICE AND RESEARCH		192
INDUSTRIAL SERVICE OF THE KANEGAFUCHI SPINNING COMPANY	SANJI MUTO	195
WOMEN'S WELFARE DEPARTMENT—NATIONAL CIVIC FEDERATION	MRS. JOHN HAYS HAMMOND	207
PROVISION FOR SAFETY OF EMPLOYEES —U. S. STEEL CORPORATION	RAYNAL C. BOLLING	209
SHOP HYGIENE AS A FACTOR IN EFFICIENCY	WINTHROP TALBOT, M.D.	215
THE CINCINNATI CONTINUATION SCHOOL	B. B. QUILLEN	227
NORTON COMPANY'S MEDICAL DEPARTMENT	IRVING CLARK, M.D.	230
EDUCATING FOR EFFICIENCY	W. B. HUNTER	241
SHOP SANITATION AND WORKMEN'S EFFICIENCY	OTTO P. GEIER, M.D.	249
INDUSTRIAL HYGIENE AS A FACTOR IN HUMAN EFFICIENCY	IRVING J. FISHER	254
THE VOCATIONAL BUREAU OF CINCINNATI	HELEN THOMPSON WOOLEY	259
ELECTRICAL INJURIES	CHARLES A. LAUFFER, M.D.	268
CURRENT REVIEW		279
ANNUAL INDEX		283

Editorial

"Human Engineering in the Orient" might well have been the title for the illuminating contribution by Sanji Muto upon the methods of human management by which his company has been made one of the greatest industrial organizations in Nippon. This success has come because the Company "has left no stones unturned in its effort to provide employees and operatives with every practical means to afford comfort, recreation and anything that will generally promote their interest," including their education in mechanical skill. The whole plan is rightly based upon the prevention of disease and injury which lie at the root of human discomfort. He speaks of the "family-like arrangements" bringing their devotion towards the Company to something far above the ordinary pecuniary relations, and feels that the management have been enabled to accomplish "something approaching the ideal of capital and labor meeting on common ground, where they may work together in harmony for their common good." This, like many other Japanese enterprises which command respect, is the outcome of painstaking study of the most profitable methods of business management the Japanese have been able to discover in Europe and America, with their adaptation to local conditions in Nippon. Were it within the bounds of possibility for an American employer to be complacent, the perusal of this article might well jolt his dormant subconsciousness.

* * *

At the last annual meeting of the National Conservation Congress, at Kansas City, the session was mainly devoted to the consideration of human conservation.

A radical advance was made by the Congress toward increased usefulness in the adoption of the resolution proposed by Mrs. Philip N. Moore, President of the National Federation of Women's Clubs, and the representative of women upon the Executive Board of the Congress.

This resolution provides for the establishment of an Advisory Board to consist of delegates from National Associations who have established Committees on Human Conservation.

* * *

One of the immediate results of this action on the part of the National Conservation Congress was the almost immediate establishment by the National Machine Tool Builders' Association of a Committee on Human Conservation.

As a leading organization of employers, the Machine Tool Builders' Association should be congratulated upon taking this advanced position. It is to be hoped that the Metal Trades and other progressive organizations will also take up the scientific study of human needs in their particular industries.

Probably no action on the part of employers would conduce more toward solving the difficult problems of employment which now cause unnecessary friction and irritation in industrial organizations.

* * *

The National Manufacturers' Association at present has a Committee on Ventilation, Heating and Lighting. If this committee can be extended as a Committee on Human Conservation in Industry, it will mark an epoch in the attitude of employers toward better methods of organization and be an evidence of their interest in economic questions of human waste and human comfort and human happiness.

Problems to be considered by such Committees on Human Conservation, on the part of organizations of employers may properly include such topics as the prevention of accidents, the prevention of industrial disease, the spread of disease among factory workers by contagion and infection, the effect of bad air, poor illumination, and improper heating upon production and breakage, as well as the study of the relation of vocational fitness, seasonal occupations and monotony to industrial management.

* * *

Scientific attention of executives to the problems of human management has been deemed unnecessary, but it is of such vital importance that it can no longer be neglected.

* * *

The combined work of B. B. Quillen, his associates and the school authorities in Cincinnati have resulted in the closest relation between Industry and Education in that progressive city.

Stimulated by their example, the employers of Fitchburg through the originality and ability of Mr. W. B. Hunter, the Superintendent of their Industrial High School, have developed probably the most successful method of industrial training in the United States.

The articles by Mr. Quillen, Mr. Hunter and Mrs. Wooley will be instructive guides to employers in other cities who are interested in constructive business organization, and we would thank the authors on behalf of our readers, for their generous contributions.

* * *

It is the privilege of "Human Engineering" to present through the courtesy of the officers of the Academy of Political Science in the City of New York a number of the papers relating to conditions of employment read at the last meeting. All the papers of the Academy will be published in book form in the course of a brief time and can be obtained from the Secretary, Professor H. R. Mussey, Columbia University, New York, N. Y.

Bureau of Industrial Service and Research

THE present amazing growth of interest in economic business organization has led to the enrollment of thousands of employers **and executives** in special courses of study during the past year and to widespread consideration of the principles of scientific management in industrial matters.

The profitable study of human needs in industry necessitates knowledge of the *successful* experiences of individual firms and corporations who have devised improved conditions for labor as a matter of executive management as distinguished from charitable or philanthropic interest.

The special organizations now concerned in promoting improved conditions for labor may be enumerated, in part, as follows:

1. National Employers' Associations.
2. Large corporate industrial organizations.
3. Chambers of Commerce.
4. The State Industrial and Labor Commissions and Commissions on Industrial Disease.
5. Federal, State and Municipal Town Boards of Health.
6. Committees on Hygiene and Sanitation of the National Medical Associations.
7. Anti-tuberculosis League and other health organizations.
8. Schools of Business Administration and Commerce conducted by Universities.
9. Schools of Social Research and Investigation.
10. Association for the Promotion of Industrial Organization.
11. National Federation of Women's Clubs.
12. National Civic Federation.
13. Consumers' League.
14. Board of Sanitary Control.
15. Labor Organizations.
16. American Red Cross.
17. Committee of One Hundred.
18. Academy of Political Science in the City of New York.
19. Academy of Political and Social Science.
20. National Conference of Charities and Correction.

In addition the National Conservation Congress has now developed into a central means of co-ordinating and correlating and

uniting the activities of other organizations. Its Advisory Board by recent changes in the constitution is henceforth to include delegates from all national organizations having committees on Human Conservation. It may well become a forum for consultation and planning.

It becomes clear from this list that there is a large number of powerful organizations, as yet largely unrelated, conducting oftentimes independent investigations, who are unable to avail themselves, through lack of information, of what is being done by others.

* * * *

IT will soon be necessary, therefore, to establish a Central **Bureau of Industrial Service and Research,** its function being to collate and disseminate all obtainable information upon prevention and treatment of injuries; prevention and treatment of industrial disease; the successful methods of establishing medical and service or welfare departments in industrial organizations; information upon industrial education, housing, benefit associations, profit-sharing, gain-sharing, and pension plans; and to assist in every possible way in aiding employers to install service departments in their plants, or in other ways to aid in improving industrial conditions.

This Bureau could be located in a convenient geographical center with branch offices in the larger manufacturing cities. The establishment of such a Bureau of Industrial Service and Research under private auspices, is advisable because more can be accomplished in that way than through the Federal government at present. The time is ripe for starting such a Bureau because of the marvelously rapid growth of intelligent interest in industrial efficiency, and the increasing economic needs of industry on the human side.

* * * *

IN such a Bureau it will be possible within two years, with the co-operation of the Government and private authorities alike, to collect information in available form and establish and publish the successful results of practical experience in handling the human problem in industry, so that any employer can obtain through the Bureau at slight cost and without delay information which at the present time can be gathered together only par-

tially, with painful difficulty and at large expense of time and money.

* * * *

NO proposition has been suggested as yet which through its results would do more to allay industrial unrest. It would stimulate a true constructive program in industry. It would promote intelligent and sympathetic leadership of labor by employers. It would further the exchange of stimulating, practical and successful experiences by employers everywhere. It would pave the way for the coming of industrial "familyship."

The underlying thought is that industrial organizations, firms and individuals wishing to make use of the services of the Bureau, shall have that privilege as owners of the Bureau through an annual subscription based on their number of employees, this annual subscription being utilized in such a way that a quarter of the fund subscribed shall be placed in an endowment fund, the interest on which, together with the remaining 75 per cent of the amount received to be used for running expenses.

Each subscriber to the Bureau would become automatically in possession of the publications of the Bureau. Each month bulletins should be published containing data pertaining to improvements in conditions of labor and the study of the human problem in industry, and upon request of subscribers to the Bureau, they would be provided with the details of such matters as they considered would be of most use to their concerns.

It would be possible also for persons particularly interested in promoting studies in improvement of working conditions, such as air analysis, study of dangerous occupations, studies in human management, by becoming shareholders in the Bureau, to create funds for any purpose in which they had an especial and personal interest.

Plans are now well under way by which civic centers already established in New York, Chicago, Cincinnati, St. Louis and Cleveland will act as branches of the Central Bureau, providing in each industrial city an educative center to supply trained help and assistance to employers who perceive the economic need in their industries of attention to the human factor.

OUTLINE OF THE INDUSTRIAL SERVICE OF THE KANEGAFUCHI SPINNING COMPANY, HIOGO, NIPPON.

By Sanji Muto, Managing Director.

The Kanegafuchi Spinning Company was established in May, 1887, with a capital of one million yen, which has been increased from time to time until it has reached over fourteen million yen.

The first mill of the company was established at Sumida-mura, Tokio (now called the "Tokio No. 1 Mill") in 1887, the number of spindles then not exceeding 29,000. Six years later the construction and equipment of the second mill was completed, which is now known by the name of the "Tokio No. 2 Mill," followed by the establishment of the Hiogo No. 3 Mill in 1895. During the period of about three years, from September, 1899, to October, 1902, eleven more mills were added to the company through amalgamation and purchase, the company then possessing fourteen mills in all under its control, with the capital increased to six million yen, and the number of spindles in operation to 218,080; in this manner the company sprang into prominence, in the comparatively short period of three years, as the largest spinning concern in the country.

In consequence of the rapid development of the company in recent years, the present number of mills is nineteen, and the number of spindles in operation under its control, 316,000.

It has been the constant aim of the Kanegafuchi Spinning Company to promote the welfare and interests of our operatives, and we have adopted the "Mutual Relief System" recognized in Europe and America as the most efficient organization for the relief of the operatives in times of adversity. We have also instituted work for the social well-being of our operatives, which is controlled by the management. The work of each branch of these organizations is enumerated below and will show that almost every necessity is provided for.

Educational Work.

Operatives' School. The aim of this school is to give a general theoretical and practical knowledge concerning the work of a spinning mill to a number of selected male operatives, who will eventually form an important active factor in the work of our mills. Nearly three hundred graduates of the school are already taking active part in our mills. The tuition, board and lodging are free, and the students are placed under a strict semi-military discipline.

School for Female Operatives. This school has been established for the purpose of giving the female operatives a good elementary education as well as a general knowledge of household training. The young girls coming mostly from rural districts have had little opportunity for an education, and therefore this school has proved a great boon.

Kindergarten. Young children of our operatives are taken care of by special nurses at our kindergarten, which also serves to give the mothers,



Kindergarten



School for Female Operatives

who work in the mill, more chance for rest. The kindergarten is liberally provided and is considered to be one of the best in the country.

Publication of Periodicals. Two semi-monthly periodicals are published by our company; one of the periodicals is for the benefit of the male operatives, and the other for the female operatives. The general purposes of these publications are: (1) to make the operatives well acquainted with the working and progress of the mill; (2) to create an interest in the work, and furnish some recreative reading matter; (3) to give details of the mechanism and working of the latest machinery; (4) to generally improve the character of the operatives by good reading matter. These two periodicals serve as organs through which the mutual understanding between the company and the operatives are adequately maintained. Suggestions for improvements are encouraged and published through these columns. It is satisfactory to the management that the purposes of these publications are being carried out in the original spirit. These periodicals are supplied free to every operative or employee and are rendering a great service for the mutual benefit of the company as well as the operatives and employees.

Lectures and Recitations. In addition to the elementary education and household training given at the school for female operatives, we recognize the importance of cultivating the mental faculties of the female operatives, and for this purpose lectures and recitations by eminent lecturers and speakers are given in the main hall of the dormitory in the mornings of the shift days (four times a month), the result of which is satisfactory in improving the character of operatives.

Female Etiquette. Instructions peculiar to female etiquette in this country are also given by competent tutors or tutoresses, which are popular with the female operatives.

The Sick, the Injured and Dependent Families.

Relief by the "Kyosai Kumiai" (Mutual Relief League). An operative suffering from disease is entitled to receive help according to the Articles of Association in the form of pecuniary assistance, and to receive medical attendance in the company's infirmary, free of charge. When injured he is entitled to receive medical treatment in the infirmary free of charge, and if incapacitated for a time or for life from the injury received during the discharge of his duty full wages will be given him for such period. The bereaved family of a deceased operative is taken care of by the "Kyosai Kumiai," which provide the daily necessaries. During confinement the female operative receives full wages and gratuitous medical treatment until she is able to resume her work.

Relief by the Company. In co-operation with the work of the "Kyosai Kumiai," the company has made special arrangements for the relief of the sick, injured and deceased, which are applicable to those cases not provided for by the Articles of Association of the "Kyosai Kumiai." Besides, special provisions have been arranged by the company for the following cases:

Allowances for invalid operatives going home,
Allowances for the bereaved family of the deceased,
Allowances for visitors to the sick operatives,
Allowances for the injured.

These allowances are so liberal that in most cases all the expenses are practically borne by the company, and every comfort is provided for these cases. In special cases not covered by the above provisions, the Committee of Relief is fully authorized to meet any emergency.

Dwellings, Food and Clothing.

Dormitories for the Female Operatives. The majority of the young female operatives coming from the country districts far away from the mills, the company give them all home comforts, so as not only to make them feel quite at home in working in the mill, but also to set their parents at ease in leaving them to our care. Commodious dormitories have been erected in the mill premises supervised by competent officials with female assistants, whose duty it is to look after the interests of the girl operatives, attending to their needs with kindness and ever ready to serve as maternal advisers to them.

The principal accommodations in the dormitories are as follows:

The apartments are provided with lockers for the operatives' belongings and furnished with clean bedding, etc. Everything is kept strictly in order so as to assure comfort and the sanitary arrangements are kept scrupulously clean.

A special room nicely furnished is set apart for the operatives to receive their visitors from home, who are allowed to stay at the dormitory for a few days free.

Correspondence is encouraged so as to keep the operatives and their homes in constant communication. Letter paper, envelopes, post-cards, postage stamps, etc., are furnished free of charge.

Bath rooms with necessary equipment are open in the morning and evening. A special toilet room nicely furnished is attached to the bath rooms.

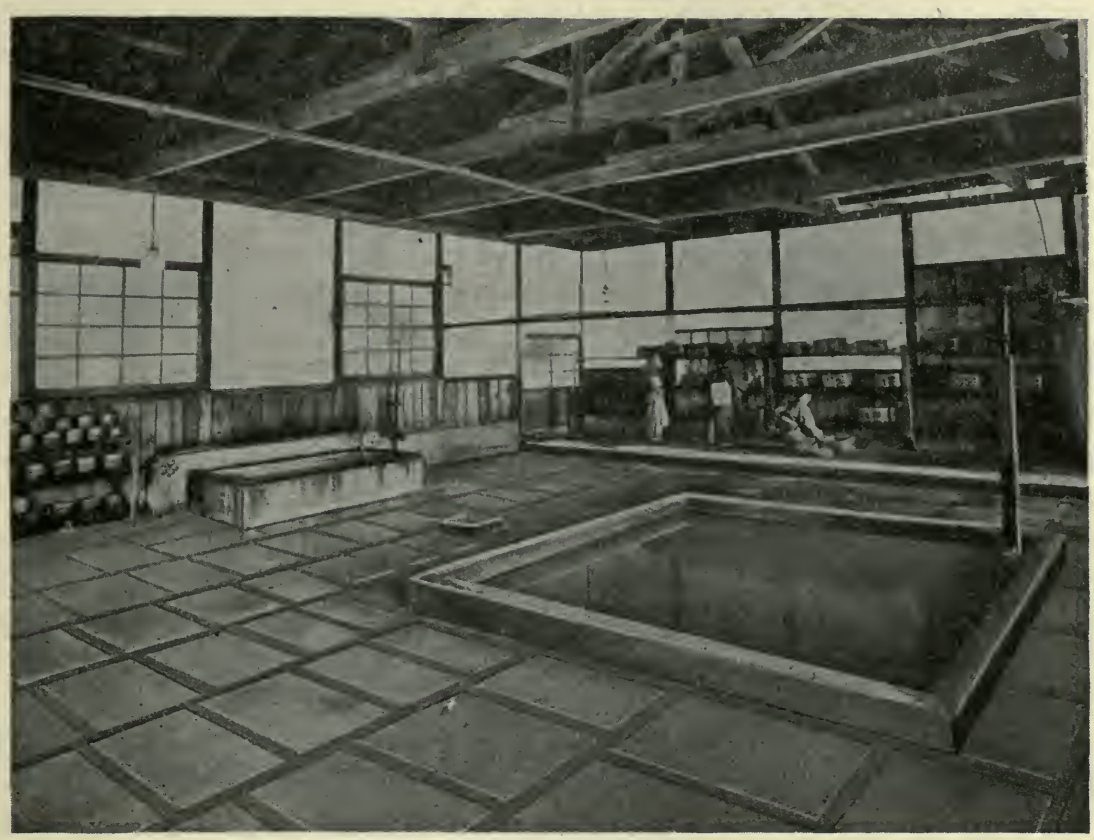
The Dressing Room. In this room the female operative is required to change her dress for the work-dress. By this arrangement the cleanliness of the operative dress is assured and the attendants of the room are enabled to collect the soiled clothes, which are sent to the laundries.

A special rest room is provided for operatives slightly indisposed, who require a few days' rest.

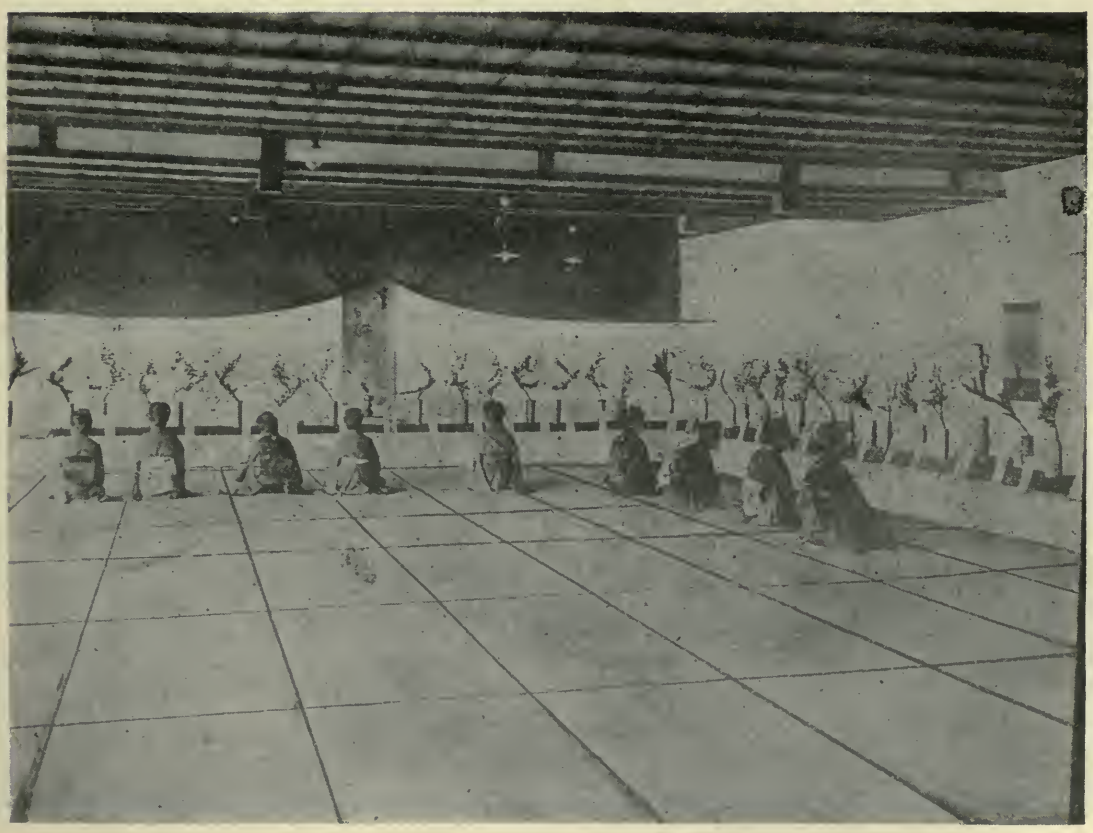
The juvenile female operatives and new recruits are taken care of in separate apartments by female overseers specially appointed to look after their interests until they are used to the life of factory-dormitory.

Dormitories for Male Operatives. These dormitories are built specially for single male operatives, with clean apartments, library, recreation room, dressing room, etc.

Tenements. These tenement houses are provided for operatives with



Bath Room



Display of Flower Arrangement by the Female Operatives

families, and similar facilities as in the dormitories are also accorded to them. Bath rooms, barber shop, and the retail shop of the Co-operative Society furnish nearly all daily requirements of the operatives living in the tenements. The rent is very cheap, being about one-third of ordinary house-rent. A tenement office with competent officers is on the premises and attends to all sorts of private needs.

The Cooking Quarters. These quarters are solely conducted by the company, and substantial meals are served to the operatives. The charge for meals is based considerably below the cost price of the raw materials, the company doing the cooking and furnishing free. The cost of these arrangements amounts to thousands of yen per month, but the company is convinced that the cost of maintaining all these welfare arrangements is more than made up by the increased efficiency of the operatives.

The Delivery Offices of Rice and Sundries. These offices have been instituted for the benefit and convenience of the operatives living in the dormitories, employees, etc. Dry goods, toilet articles, fruits, cakes, sweets and other sundries of daily requirement can be procured at first cost at these delivery offices.

The Co-operative Society. This society has been formed specially for the benefit of the operatives living in the tenements, based principally on a similar system prevalent in western countries, and supplies the operatives with all sorts of articles of daily need.

Sanitary Arrangements.

The Infirmaries. The factory infirmary is a model of compact efficiency, including a consultation room, an operating room, a rest room, a dispensary, etc., which are furnished with the most up-to-date equipments, and can be well compared with any first-class hospital in the country. Experienced physicians and nurses are always on duty and attend to the sick and injured free of charge. Every conceivable comfort is provided for the patients.

The Contagious Diseases Hospital and Bacteriological Laboratory. These have been erected on the most approved plans, with the most up-to-date equipments, and have met with favorable criticism.

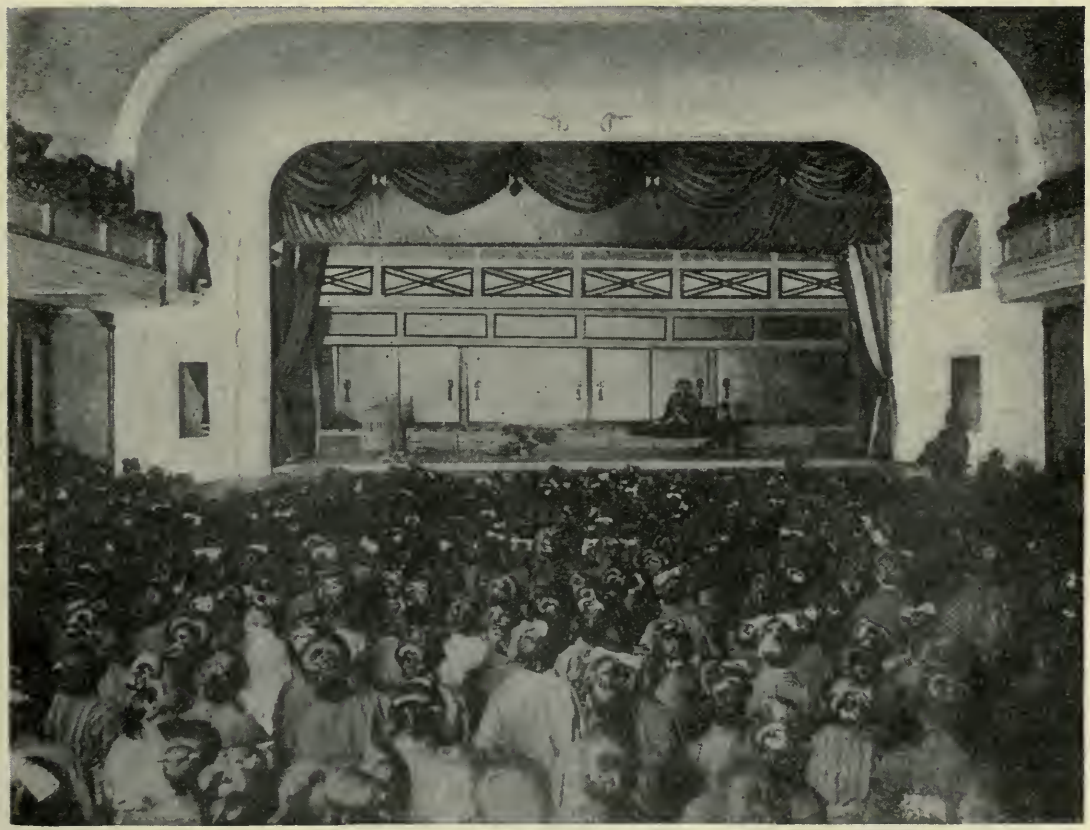
Arrangements for Giving Patients the Benefit of a Change of Air. In the summer season a change of air is recommended by the physician to a number of patients. In order to meet this requirement, these particular patients are sent to some approved watering resorts under the supervision of a physician and nurses at the company's expense.

Laundries. In one of these laundries, several laundrymen are engaged by the company to wash the operatives' work-dresses, while in the other laundries washing materials are supplied free to the operatives, who are requested to wash their clothes, underwear, etc., as frequently as possible.

Sanitoria. The company has in contemplation three commodious and well-equipped sanitoria at some seaside resorts for the benefit of operatives, who require a long rest for recuperation. The company has decided to



Recreation Hall



Interior Scene during a Theatrical Performance at the Recreation Hall

erect one of the sanitoria at Takasago, a pleasant healthy seaside resort of lovely scenery, and a sum of 30,000 yen has been set apart by the company towards the cost of construction of the building, and necessary arrangements are well under way in this direction.

Arrangements for the Recreation and Comfort of the Operatives.

Recreation Halls. 130,000 Yen have been expended on the construction of recreation halls on the premises of each mill under the control of the company. Each of these halls is provided with all the equipments of a regular theatre, with stage, auditorium, etc. Besides, an open stage is provided in the front of the hall, where a semi-open-air performance can be given in warm seasons. On every shift day or national holiday, theatrical performances, cinematograph, ballad-drama, lectures, recitations and the like are given for the recreation and amusement of the operatives.

Holiday Gatherings. On principal national holidays, great gatherings of the operatives are held in the recreation-ground, in which athletic exercises and sports by the operatives figure largely, and many amusing performances by professionals are also given. Special refreshment rooms are open free to all the operatives, employees and their families, who are admitted free in these special occasions.

Committee of Welfare. This committee is composed of principal officers of the company, whose duty it is to constantly investigate how best the company can look after the welfare of the operatives and employees, and give them the best possible comfort and recreation. The fund for the promotion of operatives' welfare now amounts to over 217,070 yen and is increasing each year.

Support for the Children of the Operatives.

Pecuniary Assistance for Bringing Up Operatives' Infants. Our welfare work is also extended to the young family of the operatives, and liberal pecuniary assistance is given for infants under two years of age.

Nurseries. Children above two years old are taken care of at the nursery by competent nurses. This nursery, taking charge of the children, the female operatives with children are enabled to attend to their work unencumbered.

Annuity System.

Annuity for long service is given to the male operatives who have served for ten years and to the female operatives who have served for five years. For the male operatives having served for fifteen years and the female operatives for ten years, the company gives them annuity for another fifteen years even after leaving the mills. After three years of service, the operatives are entitled to receive a special bonus. Special annuities are provided for operatives incapacitated while in the execution of their duty, from disease, or on account of old age, etc.

Savings and Remittance to Families.

The company allows ten per cent interest on the deposit of savings by the operatives, but as the object of allowing such a liberal interest is to encourage savings by the operatives they are not permitted to draw them out under ordinary circumstances unless there be urgent necessity for doing so. If the operatives wish to remit to their homes a part of their savings, the company gladly complies with their wishes and remits the sum required. The savings deposited by the operatives now amount to nearly 160,000 yen. Small sums are received and can be withdrawn at any time, but no interest is allowed.

Communication of the Company With the Operatives' Families.

As the majority of female operatives residing in the dormitories are from rural districts, we make a special effort to keep them in constant communication with their homes as mentioned elsewhere. The company also makes it a point from time to time to send a representative to their parents informing them as to the welfare of their children. As to those operatives coming to the mill from home every day, several clerks in charge are frequently sent out to make a round of their homes to inquire into the condition of their homes; in case of adversity it is reported at once to the Employment Bureau, which takes immediate steps to help them under the liberal provisions enumerated above.

Box for Suggestions.

Suggestions for the improvements of machines and methods for the decreasing of factory and office expenses and for general improvements are asked of all operatives and employees. Boxes for suggestions are scattered throughout the mills. Prizes and medals are awarded to those making valuable suggestions.

The Arrangements for and the Treatment of the Employees and Operatives.

It is scarcely necessary to point out here the fact that in all the successful industrial institutions, there always exists some very important asset, which is generally the result of many years' indefatigable effort on the part of the management.

The particular invisible assets which claim special reference, are the employees and operatives of the company, who attend to the daily routine of manufacture, sale and all other official as well as mill affairs and who maintain the high reputation and quality of the products which the company's trade marks enjoy in the trade both at home and abroad. It will indeed be a matter of considerable surprise to the uninitiated to realize the innumerable and indescribable difficulties that had to be contended with in fostering the existing corps of employees and army of operatives to the present efficient standard, and the company rightly take special pride in the possession of such a valuable asset as these competent employees and operatives, for, in their faithful execution of duty, in their notable feature of



Interior View of the Infirmary



Play-ground

alertness combined with diligence, and in their strict discipline based on a superb organization, lies the fundamental source of the success achieved by the company.

It is not to be wondered at, therefore, that the company leaves no stones unturned in its effort to provide the employees and operatives with every practical means that will afford them comfort and recreation, and with anything that will generally promote their interest; a special school for operatives has been established in the premises of the Hiogo Mills, where instructions for general scientific theory and for a knowledge suitable for the practical mill-work are given by competent teachers, the object of the school being to bring up operatives of superior mechanical skill; every mill under the company's control is provided with a fully equipped infirmary, or hospital, where a corps of experienced physicians and nurses attend to the sick and incapacitated gratis.

Many other arrangements prepared for the interests of the employees and operatives are now nearly completed,—a general idea of which may be had from the following funds, specially set aside for them and rapidly increasing in amount:

Pension Fund for the Employees.....	Yen 285,206
Fund for Promoting the Operatives Welfare..	217,070
Sanitary Fund for Operatives.....	53,364
Relief Fund for Operatives.....	25,099

These funds are being liberally expended for the respective purposes as indicated by the titles.

In addition there are two societies by the names of "Kanebo-Kyosai Kumiai" (Kenegafuchi Mutual Relief League) and "Kanebo-Doshi Kai" (Kanegafuchi Union Society). Both these societies are organized by the employees and operatives under special auspices of the company.

The former has for its main object the relief of the indisposed, or incapacitated, operatives; on the death of an operative, it takes charge of the funeral arrangements at its own expense and attends to the support of the bereaved family. The average annual expense for these purposes amounts to nearly 70,000 yen, but the yearly income of the society more than sufficiently meets the above expenses, being something over 100,000 yen and consisting of the members' fees, and the subsidy from the company and other contributions. The present balance of the available fund of the society stands at 82,899 yen, which is rapidly increasing year after year.

The object of the latter society, the Kanebo-Doshi-Kai, is to exclusively devote its attention to furthering the prosperity of the company and to promote the general interest of the members, the funds of the society now reaching the handsome total of 200,000 yen.

The foregoing account will suffice to give a general idea of the constant effort on the part of the company to promote the interests and happiness of the operatives and employees, for the purpose of which no expense or effort is too much to be spared. Under these liberal arrangements, the employees and operatives are in a position to enjoy recreation after the

day's toil, and they are also protected from misfortunes such as disease and accident, and when they get old and are no longer capable of work, they will be enabled to spend the rest of their life on a liberal pension. Therefore, it is quite natural that these sympathetic and family-like arrangements provided for them cannot fail to deeply appeal to their conscience, bringing their devotion towards the company to something far above the ordinary pecuniary relations, and their gratification manifests itself in the strenuous and faithful work, with which they strive to serve the company. It is a source of satisfaction to the management that we have been enabled to accomplish something approaching the ideal of capital and labor meeting on common ground where they may work together in harmony for their common good.

Such mutual sincerity and devotion of both the employers and employees, combined with a thorough, strict organization under a management of the most progressive and liberal character, are indeed the principal factors, which have made the Kanegafuchi Spinning Company what it is today; no wonder then that the Kanegafuchi Mills enjoy the reputation of being the model mills in the Orient.

In conclusion, it may be befitting to add here that, at the two important exhibitions held in Osaka and Tokio in 1903 and 1907 respectively, the Kanegafuchi Spininng Company was the only recipient on both occasions of the GOLD MEDAL OF HONOR, a notable public recognition of the achievements of the company.



In effect, Jesus said to his disciples: "I do not condemn the world, but use it in service; I do not condemn the acquisition of wealth, but acquire it for service; I do not condemn the exercise of power, but exercise it for service."

—LYMAN ABBOTT

WORK OF THE WOMEN'S WELFARE DEPARTMENT OF THE NATIONAL CIVIC FEDERATION.*

Mrs. John Hays Hammond.

The Women's Welfare Department of the National Civic Federation is an organization of women interested in the welfare of government and industrial employees. We are a body composed of three classes of women; women, who as stockholders or through family relationship, are financially interested in industrial organizations; women who are interested because of their families being employed in government departments; and women drawn to welfare work by their desire to be helpful.

Our aim is to improve the working and living conditions of the wage earners. This includes the safeguarding from unnecessary risks in dangerous and unhealthful occupations; the provision of proper ventilation, light, and sanitation; lunch rooms, rest rooms, educational and recreation resources; good housing conditions, savings funds and benefit and loan associations; recognizing always that the first essentials to the welfare of the employee are steady work, an equitable wage, and reasonable hours of labor.

Our method of work is to meet the employer, and by interesting him in the needs of his employees to work with him for improved conditions. We study the condition of many institutions and where we find points to be commended we are quick to bring them to the attention of other employers.

There is need of welfare work in every community where there are factories, stores, mines, railroads or public institutions, such as city hospitals, schools, postoffices and other government buildings.

Our Women's Welfare Department is yet in its infancy—being barely four years old—but we have lived long enough to see some of the fruits of our endeavors. We initiated a Women's Welfare Department for government employees in Washington, and Congress, animated by our efforts, has appointed a committee to inspect all department buildings and to report as to their needs in the way of proper sanitation. Following this investigation we hope that Congress will pass the bill, which our organization has urged, providing for a Government Board of Sanitation Inspectors.

The scope of our opportunity for good is limitless. With the great influx of women into industrial pursuits, many problems arise hitherto unknown in civic life. We feel that with patient study and unselfish zeal we may help to solve some of these problems. Surely the thoughtful management which has gone toward the making of our own homes may effectively be applied to bring about a considerate justice in ordering these larger homes of industry.

Our special care is women. The value of woman to the state is, after all, as a mother—and this function should not be impaired by unnecessary hardship as a wage-earner.

*Read before the Academy of Political Science in the City of New York.

In the United States there are seven million women who are employed in industrial pursuits. Unregulated hours of labor, and the lack of consideration for the worker's health and comfort, are now matters of the past, for in the changed economic conditions in the business world the employer sees that it pays to have good lunch rooms, recreation halls and means of assistance for those who are ill or in financial distress. They recognize that greater efficiency results from good working conditions.

Our work so far has been relatively local; but we have formed active sections in New York, New Jersey, North Carolina, South Carolina, Virginia, West Virginia, Georgia, and Washington, D. C. Other sections are in the process of organization, and it is our aim and expectation to extend the Welfare Department throughout every state and territory of the Union.

In every region of our great country where women are employed there is much for us to do—sympathy and intelligent aid to be given by those who have the time, means and influence to devote to this great work —the improvement of the condition of the wage-earner.



No one may do that which if done by all would destroy society

—KANT

PROVISION FOR THE SAFETY OF EMPLOYEES OF THE UNITED STATES STEEL CORPORATION.*

By RAYNAL C. BOLLING, Assistant General Solicitor.

For a long time our prayers have besought the Lord to deliver us from wars and pestilence and sudden death. At last we are doing our own part toward such deliverance by peace foundations, medical and sanitary research, and the prevention of accidents. Time was when even the most humane employers paid small heed to the prevention of accidents. Exposed set screws and unguarded gears were so much a matter of course that little effort was made to eliminate these constant sources of danger; they were looked upon as "risks of the trade." In industries such as the making of steel the temper of the time was a courage often akin to recklessness. It took men who had the courage to take chances to put this country first among the steel making nations of the world and to create in fifty years an industry which now employs nearly half a million men and produces each year ten hundred million dollars worth of the material most essential to our civilization. Over and over again these men risked all they had in the world, lost everything, and afterwards won back more than ever. In the midst of business depressions they built more mills and furnaces against a return of good times. If one built furnaces with a capacity of fifty tons a day, his neighbor tried a capacity of a hundred tons; and now the modern furnaces make seven hundred tons of iron in a single day. Engineers who designed cranes that would lift fifty tons are now building cranes which lift two hundred tons. I very well remember an expression used the first time I saw an ore ship unloaded. The great "bucket" descended swiftly into the hold of the ship with the operator riding in the "boot" above it; the huge jaws bit into the cargo of ore; and in a moment it rose again carrying fifteen tons from ship to stock pile. The young engineer beside me said: "I tell you, that's *bold* machinery!" And it was "bold" because its power, beyond control for a single instant, might sink the ship and kill the men about it. That piece of machinery and the most important machinery and methods in the making of steel today were planned in the minds of bold men. If these men sometimes allowed dangers to exist where safeguards are used today, we must not forget that they were pioneers developing an industry. They were doing in fifty years what might well have taken two hundred. A period of such tremendous development was not a time when caution would have advanced the interests of this country. Discoverers and pioneers have always been renowned for their courage rather than their caution.

We are now in a period when attention everywhere turns to conservation,—conservation of timber, of coal, of ore, of the soil—and conservation of human life, which is the chief end of all other conservation. The need for the conservation of human life in this country was shown some years ago when investigators informed us that the number of people killed and

*Read before the Academy of Political Science in the City of New York.

injured in accidents in this country each year reached nearly half a million. No small proportion of this tremendous annual toll was made up from work accidents. Unquestionably, this country paid a heavy price in injuries and death for the great and rapid development of its industries. One might paraphrase a single word in a line from Kipling and say:

"If blood be the price of industry,
Lord God, we have paid it in!"

Speaking roughly and without exactness, investigations of industrial accidents several years ago indicated that about one-third of these accidents were caused by some fault of the employer, another third by faults of the employees, and the remaining third by happenings for which neither employer nor employees were to blame. Under an outworn system of legal responsibility only for those accidents in which the employer was to blame, the employer naturally said: "I am not responsible for more than a third of these accidents; therefore I am not to blame for the conditions which exist." He had been taught to think in obsolete terms. It was necessary that he learn a new theory—that all work accidents are a proper charge against the industry in which they occur, irrespective of whose fault occasioned them. Under such a theory the employer must say to himself: "I can surely prevent nearly all the accidents due to any fault of my own; I can probably so train my employees as to eliminate most of the accidents which are due to faults of theirs; and I can perhaps avoid many of the accidents for which neither employers nor employees are to blame." Only with the coming of that attitude on the part of employers will there come effective prevention of accidents.

I have expressed the opinion that our laws relating to work accidents were hopelessly outworn. I think that was proved by the fact that only one man out of every four or five injured established his legal right to relief; that only a third of what was spent by the employers reached the injured men and their families; and that from the moment of injury employer and employee were hopelessly estranged by antagonism, suspicion and distrust at the very moment when they ought to have been drawn together. Today we are in the midst of a transition to some better system. Already ten states are trying different plans of workmen's compensation. All but one or two have refused to adopt the unfair terms of the British Act under which workmen are allowed to choose after injury whether they will accept the benefits of the act or sue their employers. Because this vicious doctrine was one of the provisions of the New York Act which was declared unconstitutional, I think we should be glad our first Workmen's Compensation Act was not allowed to stand as a model for other states. Some of those which are on trial seem to me bound to fail. I am convinced that any such form of state insurance as Ohio is trying will bankrupt any state and permit such lavish expenditure of enormous sums that the industries of the state cannot stand the burden and the people will not stomach the abuses sure to follow. I think the greatest evil of state insurance is its tendency to discourage the prevention of accidents by

relieving the employer of further concern after his premium is paid, and placing well guarded plants under much the same burden as those which have no safeguards. However, one great advantage of our federal system is that we have some fifty state laboratories working out experiments in government and political economy. From fifty laboratories one must expect a good many smells and a few explosions.

Workmen's Compensation.

For the United States Steel Corporation, we feel some pride over the fact that before a single state had established a workmen's compensation we had put it into effect among two hundred thousand employees. For nearly two years every man among them has known that, if he should be injured, he would receive relief, even though his own fault caused the accident. The exact amounts and all the details of this relief regardless of legal liability were printed and distributed among the men in thirteen different languages. This plan of voluntary accident relief was authorized and put into effect, notwithstanding the knowledge that it would add half a million dollars annually to the corporation's expenditures arising from work accidents and that it would probably hasten the adoption of workmen's compensation in this country.

In the matter of work accidents, an ounce of prevention is worth ten pounds of cure—because there is no cure. Therefore accident prevention is more important than attempted compensation to men injured and the families of men killed, whether from the standpoint of humanity or the standpoint of social and business efficiency. Only by preventing accidents can employers preserve to their employees the life and health for which there is no price and save for their stockholders a cost which does not compensate.

Safety Committee.

Five years ago the mills, mines and plants of the United States Steel Corporation were not behind their neighbors in the prevention of work accidents. They carried no casualty insurance, and were correspondingly concerned in the avoidance of accidents. Each subsidiary company had its own casualty department, striving to deal with this problem; yet in the last five years the serious accidents among those companies have been reduced to one-half their former number. In one company, employing thirty thousand men, the serious accidents have been reduced to one-quarter the former annual number. In terms of two hundred thousand workmen, this means nearly three thousand men a year saved from injury or death. I suppose the reason I have been asked to tell you how this has been done is because I have watched it done and have given such assistance as I might to the men who have done it. Nearly six years ago, under the guidance of Mr. Charles MacVeagh, all the men employed in casualty matters for our subsidiary companies were brought together, annually or oftener, for discussion of the problems arising from work accidents. Out of these meetings grew the United States Steel Corporation Safety Committee. It is composed of seven of the casualty managers for the chief subsidiary com-

panies. A representative of the United States Steel Corporation acts as its chairman. The committee meets once each quarter and spends two or three days in its deliberations.

(1) It receives reports of all serious accidents, considers their circumstances, ascertains their causes, and suggests possible means to prevent the recurrence of any more accidents of the same sort.

(2) It serves as a clearing house for all sorts of information concerning the discovery of fresh sources of danger, the development of new safety devices, and the experience of companies which have tried different methods of meeting common problems. All these matters are discussed and complete information distributed throughout the organization by photographs, blue-prints and descriptions.

(3) The Safety Committee sends to all the mills, mines and plants independent inspectors responsible only to the committee and chosen from some company which maintains rivalry with the plants whose mills are under inspection. These inspectors criticise everything which they consider unsafe and commend all effective safeguarding. They report directly to the Safety Committee. The recommendations of these inspectors are considered by the committee and, if approved, are sent to the company concerned with request for a report in thirty days showing what has been done about them. In the rare cases of disagreement between the inspectors and the plant officials, members of the Safety Committee make a personal investigation. In three years these inspectors of the committee made seven thousand recommendations from important matters such as building a thirty thousand dollar subway under railroad tracks to details such as washing the windows of a shop. Of these seven thousand recommendations, all but four hundred were immediately carried out by the companies concerned.

(4) At intervals the Safety Committee publishes a bulletin of effective safety devices and methods of preventing accidents, which is distributed among the foremen, master mechanics and all others responsible for the safety of the mills.

"Checking for Safety."

One of the most valuable methods thus established throughout the organization after trial by a single company is the method of having all plans for new construction, all drawings and orders for machinery and construction, "checked for safety." No new machinery will be ordered or old machinery reconstructed unless the plans and specifications bear an endorsement which shows that they have been examined from the standpoint of safety to the workmen. Without such endorsement they will not be passed by the purchasing or other operating departments. This has been of great assistance in safeguarding the mills and has also saved much expense, because machinery which can be equipped with safety devices readily enough when built can be safeguarded afterward only at great trouble and expense.

Co-operation With the Men.

In any campaign to increase the safety of industrial plants the workmen themselves must be interested and enlisted. Attempts to safeguard workmen without enlisting their own interest and endeavors would be about as successful as saving the souls of sinners who are satisfied with themselves. In the United States Steel Corporation subsidiary companies many different methods of interesting and enlisting the workmen have been tried with success.

(1) Over the mill gates by which the men enter some of the companies have placed large signs, illuminated at night, with admonitions such as "Help to prevent accidents"; "Look out for the other man; you may hurt him"; "It pays to think before you act." Every few weeks the wording of these signs, which are printed in several languages, is changed to direct attention to some new aspect of the campaign for safety.

(2) Many of the companies print in red ink on their pay envelopes little sermons on safety. I have in my hand three which read:

"Use safety devices provided; don't take a chance."

"Always bend nails down before throwing boards aside. Serious injuries may result from stepping on protruding nails."

"It is your personal duty to see that all safeguards and signs installed to promote safety are always in good condition and to report all dangers promptly to your foreman or superintendent. The prevention of accidents is one of your most important duties."

(3) Everywhere inside the steel mills signs and signals indicating possible sources of danger remind the men of the concern for their safety. One of the most interesting of these signs is that devised for dangerous electrical appliances. It is expressed in a universal language intelligible alike to all nationalities and to men who cannot read a word of any language.

(4) Some of the companies offer prizes for suggestions for new safety devices, and hold prize competitions for the best answers to questions asking how safety may be promoted.

(5) Some of the companies have organized in each plant safety committees of foremen and of ordinary workmen. Membership in these committees changes frequently, so that in time a large number of the workmen will have served on the committees. They make inspections at intervals which vary from once a week to once a month, and the men are allowed from their regular duties whatever time is required for their services on the committees. Members and former members of the committees wear small insignia to show that they belong to the general safety organization. All the men who have served on these committees have been taught to look for dangers and to do their best to eliminate them. They know their suggestions will be received and acted upon, and have become fellow workers with their employers, permanently enlisted in the efforts for safety.

Organized Campaign for Safety.

In this campaign for the prevention of accidents and similar endeav-

ors to improve the condition of its workmen the United States Steel Corporation spent during the eighteen months ending June 30, 1911, about a million and five hundred thousand dollars. This work requires the whole or a substantial part of the time and labor of nearly one hundred men. And it has received the careful and stimulating attention of the highest executive officers of the United States Steel Corporation and its subsidiary companies.

No ordinary employer could have conducted quite such a campaign—although any employer can do many of the specific things I have mentioned. This sort of thing requires organization. If you ask me what has contributed most to its success, I answer without hesitation the tremendous momentum of a great, effective organization. I have seen this movement, supported by such far sighted, broad minded men as Judge Gary, Mr: Farrel, and the Presidents of the subsidiary companies, acting under authority of the Finance Committee, attain in a few years a momentum which will presently bring every mill up to the standards of the most carefully safeguarded mills and will constantly raise the standards even of our best mills. I believe the highest benefit of human organization, whether in armies, churches or industries, is this momentum given to any improvement in methods which sweeps along even those who at first doubt and are half-hearted. It lifts every man to efforts a little beyond his best, and it accomplishes what the mere aggregate efforts of any number of individuals would have left unattained and impossible.

In the industrial organization of our country this is a time to see clearly and to think straight; to discard theories and to recognize facts. Our country is facing the question whether it will disorganize our industries by disintegrating them when we are daily reaping the benefits of their organization. Ask any competent investigator and I believe he will tell you that the most dangerous mills in this country today are those of the small employers. Watch the opposition to such legislation as workmen's compensation, and see whether it does not come chiefly from the small employers. I do not say this in condemnation—they do the best they can with their small capital and scant organization and constant struggle, but I believe you will find that the great advances in prevention of accidents and the adoption of workmen's compensation have been attained largely through the present attitude and assistance of the great employing corporations.

In the United States Steel Corporation there is no thought that we are anywhere near the goal of our desire in accident prevention. We aspire sometime to say "We have practically done away with that portion of our accidents which were due to the fault of the employer. We have trained our employees to eliminate almost all of those accidents which were due to the faults of the employees. We have advanced a long way toward the avoidance of that remaining portion of accidents for which nobody was to blame." If this movement were to have any motto—and mill men are not much given to mottoes—I would suggest to the men who are doing this work a line from Shakespeare which I have quoted elsewhere:

"OUT OF THIS NETTLE, DANGER, WE PLUCK THIS FLOWER, SAFETY."

SHOP HYGIENE AS A FACTOR IN EFFICIENCY.*

By Winthrop Talbot, M.D.

Skillful management of an industry requires knowledge of men as well as of material, methods and markets; not knowledge of the weaknesses of men, in order to take advantage of them, but of the capabilities of men, in order to utilize and increase them for the common good.

Scientific study of human possibilities and of decrease of waste in the application of human power to production, as contrasted with the application of mechanical power to production, may be termed "Human Engineering," and just as waste has been and is being steadily lessened by mechanical methods of handling raw material through applied chemistry and physics, so human waste will be decreased on the one hand through applied hygiene or the science of improvement of health, and on the other hand through applied psychology, or the science of mental action and its expression.

The modern idea of mental action is not that the action of the mind takes place entirely in the head; but that the influence of the mind extends to every cell of the body; there is not a single tiny microscopic cell of the body that is not in touch with the central nervous system and that has not its own particular individual life. Mental action is the composite result of the life of all these cells taken together, therefore we may readily judge that it will be affected by whatever affects the body, such as air, food, sleep and excretion.

Industrial psychology is a subject which sometime without question, will demand your careful study. The mental factor is of prime importance in any business, but the application of the laws of hygiene to shop management is today the particular phase of Human Engineering which it is my privilege to discuss.

Shop Hygiene is a fitting topic to follow the subject of efficiency, as considered last year, under the leadership of Mr. Taylor, for it is basic to shop efficiency; it may also be considered as properly sequent to the discussion of Accident Prevention and Compensation by Mr. Schwedtman and by Mr. Emery, for the neglect of Shop Hygiene is the most frequent indirect cause of accident, injury and disease. In fact, the prevention of accidents is one of the main divisions of Shop Hygiene—the meaning of the word "Hygiene," being the maintenance of health in any way soever, whether by prevention of disease or prevention of injury.

In Shop Hygiene we should deal first with general conditions affecting all employed, such as ventilating, heating, cleanliness, lighting, plumbing, lavatories and dressing rooms, and second with special conditions affecting mainly the individual such as good drinking water, shop clothing, machinery guards and medical and surgical treatment.

*Address before the National Machine Tool Builders Association.

It is impossible in the brief time at my disposal to do more than touch upon the salient and suggestive features of these topics, to draw your attention to those leaks in shop management which, taken in the main, make a steady drain upon profits. In our consideration of Shop Hygiene, let us relegate to the uttermost limbo of oblivion, the ideas of charity, philanthropy, and generosity, inherent in the common term "Welfare." Though business should be conducted for the purpose of accomplishing work for the common good it must be through employing labor at a profit.

Whatever just measures are adopted in improving conditions of labor inure to the benefit of the community and are not primarily for the welfare of individuals. They are undertaken in a spirit of service not of charity. It is difficult to conceive of any phrase more unconsciously hypocritical than the common expression, "We have done a great deal for our employees," when the fact is rather: "We have done a great deal to make conditions favorable for profitable work." This spirit of service—and it is truly service of the broadest type—should be recognized by a substitution of the words "Industrial Service" for "Welfare Work." It is more brief, accurate and clear.

It should be recognized that Industrial Service should be related closely with the accounting system of the business in reducing labor cost. Labor cost is the bugbear of business, and rightly too, but labor cost is not wages and it is business astigmatism which fails to measure labor cost in terms of production. Labor cost is determined by efficiency. But as labor cost is determined by efficiency, so in turn efficiency is determined by the laws of mental action.

Mental action is affected both by Motive and by Environment, and at this point the way parts. To follow the path of motive would lead us into the tempting fields of industrial psychology, as yet mainly unexplored. Therefore we shall consider today solely Environment or the Physiology of Business. In other words the physical conditions of labor.

The day will come soon and is perhaps already at hand when it will be considered necessary for one holding a position of authority and responsibility in industry to be acquainted with laws and conditions affecting the human machine to the same degree that he is familiar with the theory and practice of mechanics. When that day comes, we shall look back on present day conditions of labor with the same feelings of pity for ignorance and pride in progress that the superintendent of one of your up-to-date shops with its perfection of equipment, adjusted to 1-500 or 1-1000 of an inch, might look upon the antiquated methods of a hundred years ago, or as the executive of a complex cotton mill might regard the Lancashire cottage loom of the early part of the last century.

In investigating shop conditions, among even the most progressive concerns (judging from the standpoint of a student of human engineering and taking into consideration, not only hygiene and sanitation, but those physical conditions in general, which affect thought, interest, attention and concentra-



Proper Illumination



Improper Illumination

tion) we are confronted on every hand by evidences of appalling waste and in the poorer workshops, where the standard of mechanical efficiency is still low, by conditions often-times unspeakable.

While in general these statements are true, every shop condition requires special study.

Ventilation.

I leave it to you as a matter simply of common sense, whether you can do your work as well in a stuffy, ill-smelling, uncomfortable room, as you can where the air is fresh and pure, and with the right degree of moisture and heat. Working under bad air conditions fosters inattention, inaccuracy, neglect, yes, one may say, the workman is forced into those faults through the physical conditions under which he works, yet is blamed and criticised and frequently loses his job because of them. There are persons, to be sure, who, with a slow circulation, are not readily affected by bad air, just as there are people who are not sensitive to sound and whose vision is not acute. Such men are often capable of turning out a fair grade of work, especially of a rough sort, yet it is safe to assume that no human being exists who cannot do better work under good conditions of ventilation.

Good ventilation is first cousin to good nature, good manners, and good work.

Inspection and Superintendence.

If it is worth while to have a millwright especially employed to attend to the tightening of belts, to increased transmission of power, it is certainly worth while, and I commend this thought to you, in every shop to appoint a competent and interested man, one sensitive to air conditions, heat and humidity, to look after the ventilation, temperature, dryness and moisture, and let us include also the illumination and cleanliness of the plant.

"What is everybody's business, is nobody's business," and I find many shops with the best methods of ventilation supplied at large expense, and no one selected to see that this expensive mechanism is given the constant attention necessary to insure comfort to the working force, or else, if it is in the hands of any particular man, it is apt to be a man selected for the job because he is cheap. This is true even in the better class of plants. Poor ventilation is as frequent in the executive offices of the high salaried officials and clerks, as in the commodious workshop.

At another time it will be my privilege to discuss the organization of the Service Department in industrial plants, or in other words, that department which will do for the human element, what the chief engineer and his assistants do for the machine. The establishment of such a department is the practical and cheapest method of handling human comfort and efficiency and would naturally include the direction of matters pertaining to hygiene and sanitation. The Director of the Service Department naturally would rank as the immediate aid and assistant to the Superintendent. But time does not permit the further discussion of this function of management.

In the general field of education we are rapidly approaching the point where we recognize that inattention, lack of consideration, malicious mischief, and poor work, in the main, are the results of bad air, indigestible food, poor teeth, improper clothing, insufficient sleep, and other similar causes of a physical or physiological nature, such as can be avoided or removed.

A dozen years ago it was my privilege through the establishment of summer schools for boys and the study of boys in the open, to draw the attention of educators to these facts. Today in studying industrial conditions, I find a striking similarity between the shop and the schoolroom. You have the same enforced attendance, the same discipline, the same conditions of insanitation, and lack of attention to physical conditions of comfort as well as of health.

In other words, instead of blaming the child for his obvious faults, it is generally the parent or teacher, the physician or school-board, who is to blame.

Let me emphasize the intimate connection between health and comfort. As *disease* means *lack* of *ease,* so one can picture health as no other than a condition of comfort. The knowledge of this has led those of us who have paid particular attention to working conditions of ventilation to realize the careful study that what I may term the "comfort factor" demands. The relation of temperature to moisture, and this in turn to air movement is the comfort factor and comfort is not determined by the number of cubic feet of fresh air per second brought in to the establishment.

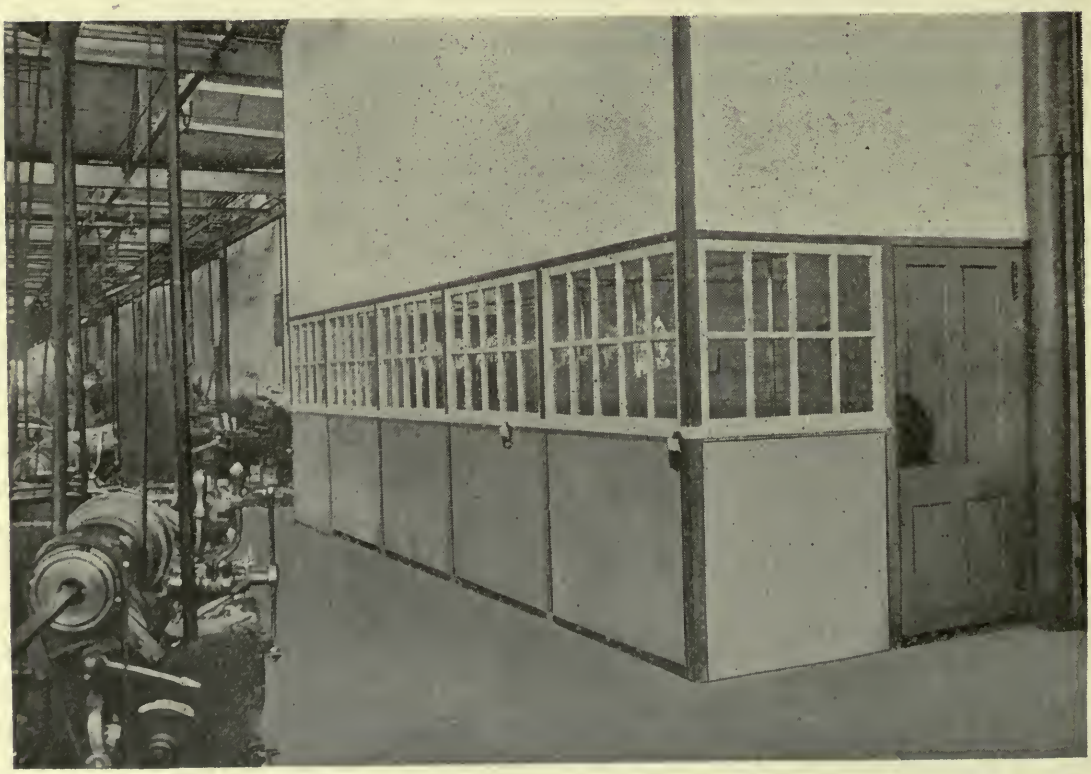
This sling psychrometer consists simply of a pair of wet and dry bulb thermometers, fastened together on a board or a strip of metal. The muslin cover of the wet-bulb thermometer must be thoroughly wet, by immersion in water, just before each observation. The instrument is then whirled around the hand at the rate of about 12 feet a second. Unless the air is saturated with water vapor, the evaporation from the surface of the wet-bulb thermometer will lower the temperature indicated by that instrument below that shown by the dry-bulb thermometer next to it, from which there is no evaporation. The drier the air, the greater the evaporation, and therefore the greater the difference between the readings of the two thermometers. If we know the readings of the wet and dry bulb thermometers, we may easily determine by tables the relative humidity of the air. The person who has charge of the comfort factor in the shop can learn in a very short time how to use this little instrument, and then know exactly what he is talking about instead of guessing at the conditions. Here is an anemometer, which is very sensitive to the slightest draft, and is also desirable in making a study of shop conditions.

As a result of careful study, by Mr. Royce W. Gilbert, made in the air laboratory of the National Electric Lamp Association under my direction last winter, it may be said, roughly, that the *optimum* of comfort in air conditions is a temperature of from 65° to 70°, accompanied by 50% to 60% of humidity, and a movement of air at the rate of from two to five feet per minute.

It is not in my power to discuss the pros and cons of the methods of



Where Cleanliness and Orderliness are appreciated



An Exhaust-Ventilated, Clean Workshop—Lavatory

ventilation. This is a subject largely complicated by the financial interests involved in the manufacture of apparatus. For general ventilation simple methods are the best—fine wire screens to keep out dust and obviate drafts, and the use of exhaust fans together with electric fans to induce air motion are practical means of producing conditions of comfort under ordinary circumstances. As this paper is solely for the purpose of drawing attention to more perfect management of industry on the human side, it is possible to do little more than summarize a few of the main points at issue, each one of which would need special elaboration and consideration under varied shop conditions.

Illumination.

The attention of all employers is being especially directed in these days to the question of illumination and the conservation of human sight in industry. The main points to be considered with regard to illumination, as in ventilation, relate mainly to comfort. Simply because there is a lot of light in a shop, the shop is not necessarily well lighted. In fact, overlighting may be as bad as underlighting. Either may be classed as poor lighting. A glare may be more uncomfortable and fatiguing to the eye than a dim light. Certain conditions demand general illumination. When work requires concentrated attention, as in special operations or in book-keeping, and artificial light is employed the mistake is as often made of supplying too intense a light as of supplying too little. Just as it is distressing to attempt to look at the sun, the source of natural illumination, so it is fatiguing to compel the eye to rest upon the artificial source of light production.

Another general rule applicable in most circumstances is that illumination upon a given bit of work, should come from behind, or, if a lamp is used to shed its light direct upon the work in hand, it should be screened from the eye. Flickering lights are bad, and lights which distort, discolor, or disfigure, can only be commended under certain conditions where other factors overweigh these objections. Lights which contaminate the air through the production of noxious gases, are to be condemned in all enclosed spaces where artificial ventilation is necessary.

Dust, Vapor, Fumes and Odors.

The questions of dust, vapors, and organic odors, such as the carbonizing of oil, and odors from the bodies of the workers demand not only the consideration of comfort but are factors in the prevention of poor health and disease, and I make a distinction between poor health or lowered vitality and actual disease processes. There are few dust-producing processes which cannot be cared for by exhaust fans, and I call to your attention the studies of the use of exhaust fans made through a Parliamentary Committee in England* two years ago, the only satisfactory study of this subject of which I

*Report of Departmental Committee on Ventilation of Factories and Workshops, 1907, Part I 3d, Part II 4s 5d. Darling and Son, Bacon St., E., London.

am at present aware. All organic odors such as the fumes of wood alcohol, varnish and paint, and probably lubricating oil, odors from the human body, probably from oils, can be overcome by the use of ozone apparatus. The free oxygen molecule of the ozone combines rapidly to oxidize these organic odors and render them imperceptible. An ozone machine can be run easily by the current from an ordinary socket lamp. It does away with disagreeable odors in a really marvelous fashion. Care should be taken in selecting the apparatus for the production of ozone to choose a type which does not produce poisonous nitrous compounds. The mechanism of most ozone machines is open to criticism on this ground.

Spitting is Spore-bearing and Spreads Sickness.

The consideration of dust leads us immediately to the thought of general cleanliness, and here we must consider first, the prevention of filth and second its removal. The Navy Yard at Brooklyn has entirely done away with spitting in its shops, and I can see no more reason why workmen should be paid to spit on the floor than to smoke cigars or pipes while at work.

It is certainly true, however, that the shop again may be compared with the schoolroom in that all human beings, whether adult or child, employer or employed, are affected by the force of example, and if the superintendent or foreman goes about the shop chewing and spitting, no posted rule will ever persuade a workman that he has not this right as well.

Cleansing Processes.

Methods of cleaning should be adopted which do not simply move the dirt from one place to another. The corn broom and dry dusters are dust *movers,* not dust *removers.* Dry sweeping is a germ distributor. Dry sweeping always to be criticised, should never be permitted in a room where there are human beings or any other sensitive apparatus. I have seen shops that have kept the employees idle for 15 minutes before 12:00 o'clock, in order not to have the employees leave before noon on Saturday, and during that 15 minutes vigorous sweeping was going on, filling the air with germ-laden dust carrying colds, bronchitis, pneumonia, diphtheria, and consumption to all, and infecting those with less power of resistance.

Lockers and Dressing Rooms.

The dustless broom, the dustless brush, sweeping compounds, hygienic floor brush, vacuum cleaning—these methods are available today, and do not excuse the use of the old-fashioned corn broom and mop pail.

Lockers should be provided, if illness is to be prevented. It cannot be considered good shop practice to be so lacking in facilities that workers shall have no place to keep a shop uniform or suit, or to change and dry the foot gear. I have found in investigations undertaken during the last six months that a large percentage of the absence is caused through the workers taking cold by being obliged to work in rain-soaked garments, or by going out doors in clothing that they have worn all day in the shop. This is not only true of women workers, but also exists among the men.

Under the general head of sanitation and hygiene naturally would come the consideration of dressing rooms, lavatories, and plumbing. All up-to-date shops have individual lockers for the workmen. The preferable form is the metal locker closed on the side with partitions, but open throughout the whole length of the front for inspection and cleanliness. The closed locker, in my judgment, is an abomination. The locker in itself must be kept sweet and clean, and is a clear indication as well of the character of the owner. In this connection I do not know of any better way of studying the char-



A Well-Lighted and Well-Ventilated Factory

acter of a school-boy or a workman than by studying the way in which he keeps his clothes. If he is neat and orderly in that particular he is almost always neat and orderly in other directions. The man who keeps his locker in a disorderly state will be wasteful at the bench.

Lavatories and Fountains.

The trend in the best organized shops is to individual basins, as increasing the self-respect of the workman and helping to attract the better class of labor. In the end, the best plumbing is the cheapest. Poor lavatory facilities and hidden plumbing invite the propagation of syphilis and gonorrhea—the "black plagues" of industry today.

Another consideration to which I desire to call your attention is the legal necessity in many states, and before long in all the states, of abolishing the common drinking cup. Drinking fountains are desirable. The type which provides a sufficient stream so that the lips of the person drinking cannot touch the apparatus is the best.

Lunch Rooms.

There was a time when the question of providing lunches for workmen was regarded in a measure as a charity or kindness. Trained observation and experience have demonstrated not only that where plants are isolated or surrounded by low-class saloons, it is advisable to provide a lunch room but that in every case where fifty or more people can take their lunch, the lunch-room should be made to pay its own way after the initial installation.

Many working people have not a good appetite in the morning and come to their labor either without breakfast or after drinking simply a cup of badly prepared coffee. Most laborers are small eaters comparatively, and it is, therefore, especially worthy of a manager's attention to see that the afternoon work is made as effective as may be through supplying an opportunity for the workmen to get an appetizing and nourishing noon-day meal. The cold dinner is a knock-out drop for afternoon energy.

Work Clothing.

Passing to the consideration of prevention of injuries, we must regard ill-fitting garments, slouzy shoes, and long sleeves as a direct invitation to stupid accidents. I believe that insurance policies used to include "Act of God" in referring to certain types of industrial injury, but we are learning that if "There is a Divinity that shapes our ends, rough hew them as we may," that divinity is what exists in man himself, and when accidents occur and injuries follow, we will do well to study the short-comings of our own ignorance and lack of forethought!

It is of particular interest that especial attention is being given to this matter by the National Machine Tool Builders' Association, not only in providing safe shop conditions for themselves, but in adopting standardized methods of safe-guarding the tools manufactured in this industry. Probably no industry has in its power to do more to reduce the total number of injuries to workmen than this Association.

A permanent committee might well be appointed to consider the relation of this industry to the matter of human conservation, through support and consideration of standardized methods, not only of preventing injuries, but of increasing human comfort and power of accomplishment.

I have recently attended the National Conservation Congress in Kansas City. Two years ago they started with the consideration of conservation of forests; then they began talking about farms and mines, then the workers on the farms and the workers in the mines; but this Congress spent nearly two-thirds of its time in discussing human conservation, and they took a step distinctly forward by amending their constitution so as to provide for the appointment of an Advisory Committee to consist of delegates from those national associations who appoint committees upon human conservation.

Medical Treatment.

In line with this thought comes the practicability of establishing medical centers in each plant not only for the treatment of injuries, but for the pre-

vention of ill health and disease. Many concerns have established a medical service in connection with their plants and in every case the value of such a service has paid for itself many times over. It is no longer a debatable question of policy but is simply a matter of detail and method in installation.

* * * * *

Workmen cannot be induced to employ a physician for those slighter ailments which, if taken in time, would almost preclude the possibility of serious disease following. Prevention in every case is better than cure, and where absenteeism means idle machines and owners are alert enough to their own interests to study cost-accounting, the value of the medical service is so self-evident as to require no particular exposition of its benefits.



A Clean Water Fountain

It may be remarked, however, that the personality of the medical officer will determine largely the amount of saving made possible. If he is humane, sympathetic, with good judgment, and able to command the confidence of his patients, he can do much to foster the best kind of *esprit de corps* and trade enthusiasm. If he is cold and gruff and repellent in manner, with a proclivity to an indiscriminate use of the knife, he should best be discharged before he is employed, for I am enough of a believer in the medical profession to venture to assert that it is possible for any employer to engage the services of an intelligent and humane physician at larger profit to his industry than any cheap and careless practitioner.

Human waste in industry is Industrial Mismanagement.

Human waste in industry is an offspring of Ignorance, begotten by Stupidity, born in Neglect, suckled by Indifference, and raised by Habit.

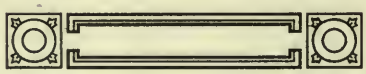
Human waste in industry prowls about in every shop, store, mine, railroad and factory, haunting the garbage pails of Inefficiency. It fattens on Foul air, thrives in Dirt, and all Insanitation, sucks the blood of Profit and nips the Ledger Balance by the throat.

Human waste is the pest of the business world. It is our work to kill it.

Human Conservation lays the golden egg of industry.

Human Conservation is the choicest possession of employer and manager.

The neglect of Human Conservation means smaller profits. The fostering of Human Conservation means larger ventures and greater dividends in money, contentment and human happiness. It heals wounds, it stills the contention of discontent, it unites the employer and employed in their single and common interests. It is a constructive force amid our industrial problems of untold worth to the surest upbuilding of the Nation's life. What greater usefulness may one seek in life than to further in such ways as we each may the cause of Human Conservation in Industry?



It is much easier to be critical than to be correct

—DISRAELI

THE CINCINNATI CONTINUATION SCHOOL.

B. B. Quillen, Secretary Cincinnati Planer Co.

Having been closely associated with the work of the National Metal Trades Association, the subject of industrial education was brought to my attention many many times, and I soon discovered that in addition to the splendid work that was being done for young men by Professor Herman Schneider, of the Cincinnati University, through his course of co-operative engineering, and by the many trade schools throughout the United States, there was a greater need for a day school in which the younger boy or apprentice could be taught those studies pertaining to his particular trade, and with this idea started out to develop some kind of a practical school for the education of apprentices to the machinist trade in Cincinnati.

Calling together a few of the leading local machinery manufacturers, we went into the subject thoroughly and finally hit on the plan of sending the boys to school one-half day each week and paying them for it.

We at first thought of starting a private school for the apprentices, developing the plan and afterwards turning it over to the public school system; we also had a proposition up with the Young Men's Christian Association; then the idea was presented to Professor Dyer, superintendent of the Cincinnati Public Schools, who was liberal minded enough to lend it encouragement right from the start and a meeting was arranged between our Committee on Industrial Education and the School Board, where the plan was fully discussed and afterwards unanimously accepted. Professor Dyer was ready to start the school at any time we could supply him a practical teacher and send the boys. All this was accomplished within three or four weeks, so you can see no time was lost in bringing our ideas to realization.

No red tape, no politics, no unionism entered into this proposition; it was accepted on its merits only, and handled in a thoroughly business-like manner by the School Board.

To find a teacher was the next important step. At this time Mr. J. H. Renshaw was conducting a private school for apprentices, and had built up quite a reputation for successfully teaching boys, having a peculiar and very effective method of instruction. As he was a practical shop man and had worked in several of the local machine tool shops, our first thoughts were of him, and we lost no time in bringing him in touch with Professor Dyer; he accepted the School Board's proposition, turning his private school and everything over to the public school, and on Monday, August 30, 1909, the first Continuation School in America was opened in what was formerly Renshaw's Private School, with about 200 boys in attendance.

The manufacturers do not feel that they are making any sacrifice in paying these boys while in school as their increased efficiency more than makes up for the lost time. The boys in our own shop show beyond a

doubt that they are able to produce better results than the boy who has not availed himself of this course.

Specialization is as necessary along educational lines as it is in manufacturing and that is one of the great advantages of this school, the boy is taught just those things that are of use to him in his every-day work, shop mathematics, drawing, freehand sketching, etc. It is better to teach an apprentice for the machinist trade how to read a drawing than how to read English literature.

There is also just as much danger in teaching the apprentice too much as there is in teaching him too little, and by attending this school one-half day each week for four years, should give him all the education necesasry for a first-class machinist.

The local Metal Trades Association has a committee composed of five superintendents of the largest machine shops, who work with the teacher and school board.

Recently they have gotten about twenty-four superintendents and proprietors of the different local machine shops to agree to devote one-half day each month to the school. They call only at the last four sessions in the week in which the advanced students are, look over their studies, and if possible suggest some additional practical subjects to be taught. They are also requested to give the boys a ten-minute talk on some shop practice that is not taught in school and usually omitted by the shop foreman.

Realizing that complete success can only be had by having the shop foremen or gang bosses see the advantages of this practical education for boys, the committee is now working on a plan to have some of the foremen come down to the school to see what the boys are able to do. Through this they will be more interested in the apprentice, show him more attention in the shop, help raise the standard of our present boys and this will lead naturally to having a better grade or class of boys coming to the shops as apprentices.

We find the boys very enthusiastic about this school, they like the idea of getting away from the shop a half day, it is a sort of vacation for them, and this will insure to the school a full and regular attendance. A check system is used in the school to insure the boy coming in on time, the same as he would in the shop. A weekly report is sent to each shop, showing whether the boy was absent or late; if he comes late he is docked by the shop time-keeper the same as if he had been late to work. We insist on all apprentices attending the school and if they quit school they must also quit the shop.

I would sum up the advantages of this Continuation School as follows:

1st. It enables the school to give special training to a greater number of boys at less expense than any other known system.

2nd. To the manufacturer, it gives a more efficient class of boys and it will be the means of bringing more boys into the shop, thus helping to solve one of our greatest labor problems.

3rd. To the boy, it affords an opportunity of securing a good, practical education, which he would otherwise not get, making a better mechanic out of him and a better citizen.

4th. It will bring a number of boys into the shop, who are now working at various odd jobs in which there is no future, teach them a good trade and keep them from being common laborers, which is their only alternative as they get older, without some trade.

Our particular line of trade is suffering greatly from a scarcity of apprentices, and I know of nothing that will tend to attract them more readily to the machinist trade, than the opportunity of securing a daylight education at the expense of the employer.

We should devote both time and money to industrial education and welfare work. It is our duty to assist, guide and protect our young men. They must have someone to champion their cause,—why should it not be the employer?

CHRISTMAS WAITS

Everything comes to the man who goes after the things some other fellow is waiting for.

Everything may be coming to the man who waits, but it's seldom that anything arrives.

Everything comes to him who waits the least.

Nothing that comes to the man who waits is worth waiting for.

Some men seem to think that a chance in life is a capital prize Destiny will award them for being patient waiters.

Everything comes to him who lets the other fellow do the waiting.

The fellow who always waits for something to happen, happens to have to wait always.

—JOS. F. HOSTELLEY

NORTON COMPANY'S MEDICAL DEPARTMENT.

By Dr. Irving Clark, Norton Company's Medical Dept.

The Norton Company established its medical department during the latter part of May, 1911.

The department was the outcome of two ideas: first, that a medical department would increase the efficiency of the employees; second, that it would increase the already well-marked good feeling between the men and the company.

As the belief that increased efficiency may be obtained by caring for the physical condition of employees is somewhat new, its basis will be sketched.

In the consideration of production in any given department, practically every mechanical item can be accurately estimated. It would be possible to figure the exact cost and output of any department, provided that all the work in that department, even to the minutest detail, were done by machinery; that is, provided that the human element could be eliminated.

It is this human element which cannot be accounted for and which, therefore, should be given very close attention.

To obtain maximum results, for the work at which it is engaged, the human material must be maximum quality, and maximum quality in factory employees means perfect physical health.

The problem of health, therefore, assumes a new proportion in considering efficiency, and we might say that if every man employed were physically well, all departments would run with the utmost smoothness and production.

To produce such an ideal condition is of course impossible, but an approach to the ideal is quite possible.

In an attempt to investigate this problem the following steps would seem rational:—they have been adopted by the Medical Department.

1. Complete physical examination of all employees.
2. Immediate attention to all defects found at examination, and an effort made to rectify the same.
3. Re-examination at regular intervals of employees having physical defects, to see that they are in the best condition possible.
4. Immediate attention to all employees incapacitated by injury or illness, and an effort made to get them into normal condition in the shortest time.

The practical results of such a plan if systematically carried out should be as follows:

1. Immediate elimination of those absolutely unfit for work.
2. An increase in the capacity of the partially unfit by slight changes in work, medicine, mode of life, etc.
3. An exact knowledge of those who may become partially or wholly unfit, and a continued effort to keep this from occurring.

4. A prevention of sickness by advice given to well employees and by immediate attention to slight ailments.

5. (a) A reduced time of recovery from accidents. Wounds and injuries properly treated at once heal very much more quickly than if treatment is delayed.

(b) The elimination of so-called blood poisoning, by proper treatment of wounds.

6. The elimination of active Tuberculosis, Syphilis, or any condition dangerous to other employees.

The outfit and method of the Medical Department in its efforts to carry out this plan, and the results up to the present time, are as follows:

The Hospital.

This consists of a room of moderate size, well lighted and ventilated by two large windows, and having a carefully selected equipment. It contains a desk, an instrument cabinet, a glass-top table for dressings, a sterilizer for instruments and dressings, and an examining table. Beside this, there are numerous solution bowls, instruments, dressings, etc. In short, it is a miniature dispensary.

The Physician.

The doctor gives about three hours a day at the factory; about an hour and a half in the morning and the same length of time in the afternoon.

In the morning he examines all sick employees applying for treatment, and either prescribes for them, or, if they are sick enough to have to stop work, advises them to call in a physician. In the majority of cases, however, the men have minor ailments which readily yield to simple treatment.

The afternoon is devoted almost exclusively to making physical examinations.

NORTON COMPANY MEDICAL DEPT.

Diagnosis

Name **Age** **No.** **Dept.**

Duration of Sickness

Time Lost **Days** **Hours**

Printed Form for Diagnosis Record and Time Lost

The Functions of the Medical Department.

These are three in number:

1. The care and after treatment of accidents occurring to employees.

2. The complete physical examination of every employee, and an attempt to remedy all existing physical defects.

3. The examination, diagnosis and advice of all employees complaining of any sickness whatever.

We will now consider these three functions in detail and endeavor to show what has been accomplished in each.

Care of Accidents.

Despite a committee of safety which is continually introducing new methods of prevention, a large number of accidents are bound to occur in any large factory.

In the majority of cases, if these accidents receive prompt and efficient care they prove merely an inconvenience to the employee, perhaps preventing his work for 48 hours but seldom longer. Even the smallest wound or scratch, however, if it becomes infected, may lead to a long and sometimes serious illness.

Therefore prompt attention and thorough cleaning of all wounds become a matter of prime importance.

It is also important that an employee receive immediate attention by some one in the department in which he is working and that he be removed from the department as quickly as possible, in order not to break up the work of the other employees.

Bearing these facts in mind, the Norton Company has devised the following method:

Once a week for 10 weeks all the foremen of the different departments were called together and the doctor gave a thirty-minute talk upon the various accidents most frequently met, and their immediate treatment.

The subjects lectured on were as follows:

1. Hemorrhage and Its Treatment.
2. Burns and Bruises.
3. Lacerations and Cuts.
4. Sprains.
5. Fractures and Dislocations.
6. Infections (blood poisoning) and Treatment.
7. Resuscitation from Gas, Fainting, Etc.

Each lecture was made as simple as possible, and was illustrated by blackboard drawings and actual demonstrations, such as putting on bandages, splints, etc. At the end of this course of lectures an oral examination was held, and since then there have been examinations and conferences about once a month. The foremen have shown great interest in this part of their work, and have ably demonstrated their ability to apply the principles they have learned. At the present time the foremen are coming three at a time to the doctor to put on bandages under his supervision.

Each forearm is provided with a first aid jar (see page 237) containing:

3 bandages of different widths.
1 package of sterile gauze pads.
3 finger splints.
1 tourniquet (rubber).
1 measuring glass.
1 bottle of aromatic spirits of ammonia.

The jar has general directions on the outside, and there is, in addition, a card of first aid directions posted in each department.

First Aid in Cases of Illness or Accident.
Instructions to Dressers.

First Duties

1. Notify Doctor, i. e., W. Irving Clark, M. D., 37 Pearl St. Telephone Number 694-2.
 or
 Philip H. Cook, M. D., 771 Main St., Telephone Number 2168-5.
2. Telephone for ambulance, if necessary, Number 7140.
3. Prepare bowl of hot water, soap, scrubbing brush and gauze for cases of cuts and bruises.
4. Prepare splints in cases of severe injuries.
5. When patient arrives, proceed at once following directions given by doctor for that type of injury.

For Burns and Scalds

1. Remove all clothing from injured part.
2. Immerse extremity in large pail or foot tub containing sat. sol. bicarbonate of soda.
3. Parts which cannot be immersed should be covered with soft cotton cloth soaked in carron oil.
4. Slight burns should be powdered with compound steareate of zinc powder.
5. If much shock, give one teaspoonful aromatic spts. of ammonia in one-half glass of water; or, one teaspoonful of brandy in one-half glass of water.
6. Give one-sixth grain morphine by mouth if pain unbearable.

For Fainting and Sudden Sickness

1. Get patient on back with head lower than heels.
2. Give one teaspoonful aromatic spts. of ammonia in one-half glass of water.
3. Towel in cold water to head.

For Fractures and Dislocations

1. Remove clothes about part by cutting.
2. Put part at rest on splint, after applying a dressing of gauze soaked (sopping wet) in lead and opium mixture.
3. Let patient lie down.
4. If pain very severe give morphine grain one-fourth.

For Major Injuries—Fractures with Laceration, etc.

1. Remove clothes around injury by cutting.
2. Wrap all exposed parts EXCEPT INJURY in blanket.
3. Put patient on his back.
4. Cover with blanket.
5. Wash around wound thoroughly with soap and water as in minor injuries.
6. Put on large pad of gauze soaked in bichloride of Hg. 1-1000.
7. If patient pale and white, one teaspoonful aromatic spts. of ammonia in one-half glass of water.
8. If much pain, morphine grain one-fourth, by mouth.

For Minor Injuries—Crushing or cutting injuries involving fingers, hand, foot or small areas.

1. Clean thoroughly by washing part in hot water with green soap, using scrubbing brush for area around the wound and gauze for wound itself. DO THIS FIVE MINUTES BY WATCH.
2. Wash off in Turpentine or Benzine (NOT IMMERSING).
3. Soak in bichloride of hg. 1-1000 sol. for THREE MINUTES BY WATCH or until doctor arrives. If doctor is not required, apply sterile gauze, bandage and finger splint.

DO NOT TRY TO STOP FLOW OF BLOOD UNLESS VERY SEVERE; THE HOT BICHLORIDE SOAK AND BANDAGE WILL DO IT.

Norton Company Emergency Service.

First Aid in Cases of Illness or Accident.
Instructions to Foremen.
Duties of Foremen.

1. Set or lay patient down.
2. Notify Factory Hospital (Laboratory, Telephone No. 32) explaining character of accident.
3. Get clothes well clear of injured part.
4. (a) Apply temporary bandage to stop bleeding, or
 (b) Apply splints (temporary).
5. Give one teaspoonful of aromatic spts. of ammonia in one-half glass of water, if necessary for faintness.
6. Convey patient to laboratory on stretcher or otherwise.
7. Take care that first aid box is kept in order and fully supplied.

Norton Company Emergency Service.

When an employee is injured the following is the routine:

1. Foreman administers first aid and notifies main office.
2. Main office notifies doctor and trained dresser.
3. Patient is conveyed to the hospital where dresser prepares case for doctor's examination and treatment.
4. Doctor arrives at hospital and cares for the case.

All cases of foreign bodies in the eye are cared for by the doctor in person. When the body is a particle of steel or alundum which has penetrated the clear part of the eye, the eye is dressed and patient sent immediately to an occulist for operative removal. Unless treated with the greatest care these cases are apt to result in permanent injury to vision.

While our system of caring for accidents has not been in force long enough to make any statistical statement, we can say that no clean injury has become septic, and that no employee has been obliged to be absent from work more than a week, except two very severe eye cases. In the majority of cases the patient has been able to return to work immediately after treatment.

The type of injury met at the factory may be seen from the following list, which is of the injuries received during the past three months:

Accidents.

Wounds:

Lacerated wounds of face	4
Lacerated wounds of eye	1
Lacerated wounds of fingers	6
Lacerated wounds of leg	2
Incised wounds of arm	2
Incised wounds of finger	8
Incised wounds of hand	4
Puncture wound of foot	1
Total	28

Crushing Injuries:

Contusion of fingers	6
Compound fracture of finger	1
Contusion of sternum	1
Contusion of foot	1
Contusion of leg	2
Total	11

Sprains:

Of wrist	1
Of thumb	1
Of ankle	2
Of great toe	1
Total	5

Foreign Body in Eye:

Total	13

Miscellaneous:

Flat foot	1
Papilloma of finger	1
Burn of face	2
Burn of forearm	2
Abrasion of leg	1
Infected fingers	3
Synovitis of knee (traumatic)	4
Total	14

An examination of these statistics shows that, while there are practically no serious injuries, there are many which if not properly cared for, may lead to considerable loss of time.

By the method above outlined all injuries receive prompt and efficient attention, and subsequent dressings are done by the doctor until the patient is entirely cured.

Physical Examination of Employees.

The physical examination of employees is rather a new departure, but to our minds it is the corner stone in building up physical efficiency.



The Physician's Office



The Surgical Dressing-corner

Each employee receives a complete physical examination.

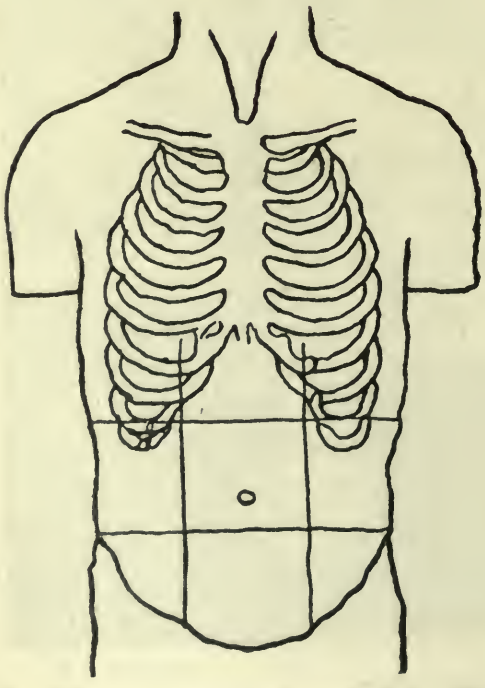
We believe that, unless a physical examination is complete, it is of little value, because it is impossible to foresee where a weakness may appear which will have a definite effect upon the efficiency of an employee.

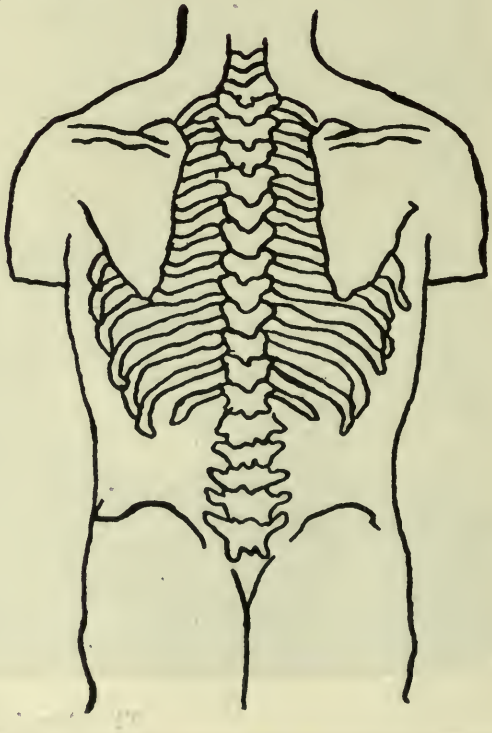
Each employee is therefore examined carefully for defects in all organs, and the results entered upon the card which is shown in the cut.

Any abnormal condition of the chest, back, or abdomen is charted on the diagram.

NORTON COMPANY, WORCESTER, MASS.

Name	**No.**	**Dept.**	**Abdomen**
Age	**Date**		**Pulse**
Gen. Appearance			**Extrems.**
Eyes			**Ing. Reg.**
Ears			**G. U.**
Nose			**Spine**
Throat			**Skin**
Tongue			**Diagnosis**
Teeth			**Urinalysis**
Neck			**Color** **Alb.**
Chest Contour			**Ppt.** **Sugar**
Heart			**Sp. Gr.** **Microscop.**
Lungs			**React.**





After examining a man the doctor discusses his physical defects with him, and strongly urges him to attend to any weakness.

Thus men having ruptures are advised trusses. Those with poor teeth are advised to go to a dentist; and all men are instructed in the importance of the care of the teeth. If any minor disease exists, advice is given, with prescriptions if necessary. The employee is told to report again in two or three days as the case requires. Where there is reason to suspect pulmonary tuberculosis, a sputum examination is made, and where the kidneys are suspicious, a urinalysis is done. We expect to make a complete urinalysis on all employees over 40 years but have not started this work yet.

If the employee examined is too sick to work he is sent at once to his family physician.



A Clean Method of Keeping First Aid Dressings

It will be seen from this that every attempt is made to get the men in perfect physical condition to start with. But this is not all. When an employee is found to have a weak heart, and is doing work injurious to that heart, his work is modified. When a man has a double rupture he is not allowed to do very heavy lifting, etc. Men found having organic disease are required to report at varying lengths of time for examination and advice.

In this way the weak spots of the human machinery are kept under close supervision, and any rapid degeneration prevented.

The results of this side of the work have already been most en-

couraging. The men take a great deal of interest in their personal condition, and are quick to appreciate the relief afforded by the simple remedial measures adopted. We have had but one objection in the course of six hundred examinations and the majority of men thank the doctor on leaving the hospital.

When a man has once been examined he is pretty sure to return for advice at his first subsequent sickness.

By his examinations and subsequent intercourse with the employees, the doctor is able to get in very close sympathy with his patients, and they will discuss many things with him freely. He is thus able to use his influence to prevent the minor vices such as over smoking and late hours among the younger men, and, in several cases, has had very gratifying results in his efforts to keep valuable men at steady work who have a tendency to "sprees." Working men will listen to advice from a doctor, and what is more, follow it, when from any one else it would prove of no avail whatever.

The moral power of the doctor must necessarily become greater as time goes on, and the men become more and more convinced of his good faith and interest in their physical welfare.

The defects found have been divided into three classes. Medical, Surgical and Special Sense.

1. Medical:

Catarrhal jaundice	1
Nervous disease	3
Heart	32
Pulmonary TB	4
Arrested Pulmonary TB	16
Pleurisy	9
Cirrhosis of liver	9
Emphysema	9
Chronic arthritis	3
Acute bronchitis	17
Chronic Bronchitis	3
Indefinite	4
Head cold	4
Indigestion	2
Constipation	1
Subacute gonorrhea	3
Possible syphillis	1
Total	113

2. Surgical:

Enlarged glands	29
Tumors (benign)	14
Movable kidney	2
Flat foot	19
Varicose veins	47
Inguinal hernia	43
Synovitis of knee	3
Varicocele	29
Undescended testicle	2
Sarcoma of testicle	1
Hydrocele	6
Chronic dislocation of patella	1
Ingrowing toe nail	4
Hallux valgus	5
Old Potts disease	1
Furunculosis	2
Femoral hernia	1
Total	209

3. Special Senses:

Eyes:

Strabismus	2
Defective vision—one eye	33
Defective vision—two eyes	19
Conjunctivitis	15
Total	69

Ears:

Deafness—one ear	47
Deafness—two ears	72
Discharge—one ear	4
Discharge—two ears	3
Total	126

Nose:

Rhinitis	9
Deviation of septum	58
Obstruction	12
Polyp	1
Ulceration	1
Total	81

We now come to the third function of the medical department, which consists in examining and advising all sick employees.

Dispensary.

Previous to the establishment of the medical department a sick employee saying he was unable to work was allowed to go home. Now he must apply to his foreman and is then sent to the hospital. There the doctor examines, advises, and prescribes for him. Often it is found that one of the simple remedies which are used at the hospital will give such immediate relief that the man is able to return to work. If, on the other hand, a really serious condition is discovered, the man is sent home, his physician notified, and everything done to get him under proper care at once.

In connection with the dispensary the foremen are provided with "sick slips," which they fill out in all cases of injury or sickness, giving the date of absence from the factory, and the number of days or hours of lost time. These are filed by the doctor, by department, and the length of absence and cause noted on the original examination card. When the man has left the factory without seeing the doctor, he is sent for on his return, and the cause of his absence obtained. This is then noted on the "sick slip."

NORTON COMPANY SICK SLIP
MEDICAL DEPT.

Mr. **No.** **Dept.**

Left work at **o'clock on** **191** **because of**

Sickness—Accident, and returned to work on **191**

having lost **Days—Hours because of it.**

Foreman

Foremen must fill out this slip AT ONCE upon return of sick or injured employee to work, and file IMMEDIATELY at office of the Superintendent.

All physical examinations are filed by name and two lists are kept, one of normal men, the other of those having defects. By this system the exact physical condition of each employee is known, as well as any sickness or accident he may have had; and the length of time he has lost by each.

By turning to the "sick slip" file the number of cases of sickness or accident in any department may be immediately seen, as well as the names of the men, the disease or accident causing the absence, and the amount of time lost.

The dispensary function of the hospital is growing in popularity among the men, and it is hoped that the intercourse between doctor and employees will promote additional good feeling between the employees and the company. The medical cases which have been treated during the past three months, and the number of cases are as follows:

Medical cases:	
Chronic gastritis	1
Ulcer of duodenum	1
Gastro-enteritis	20
Acute Rhinitis	6
Hiccoughs	1
Muscular pain	2
Chronic alcoholism	1
Moth poisoning	1
Conjunctivitis	3
Furunculosis	1
Febricula	2
Dermatitis	1
Chronic rheumatism	1
Subacute bronchitis	2
Tape worm	1
Toothache	1
Hemorrhoids	1
Tonsilitis	3
Constipation	3
Myalgia	3
Sciatica	1
Jacksonian epilepsy	1
Acute laryngitis	3
Inguinal pain	1
Acute pharyngitis	2
Total	63

In closing we would have it distinctly understood that this is only what would be termed in medical parlance a preliminary paper. The work has been going on only six months, and the development has naturally been slow. It will be several years before statistics can be obtained to show whether or not efficiency has been promoted. However, as far as we can judge from the small data at hand, there is good reason to hope that ultimately a high degree of physical efficiency may be achieved, as well as a closer sympathy between the employees and the company.

THE REAL GUIDE

By BERTON BRALEY

You may bring to your office and put in a frame
A motto as fine as its paint,
But if you're a crook when you're playing the game,
That motto won't make you a saint;
You can stick up the placards all over the hall,
But here is the word I announce,
It isn't the motto that hangs on the wall,
But the motto you LIVE that counts!

If the motto says "Smile" and you carry a frown,
"Do It Now" and you linger and wait,
If the motto says "Help"—and you trample men down,
If the motto says "Love" and you hate,
You won't get away with the mottoes you stall,
For Truth will come forth with a bounce;
It isn't the motto that hangs on the wall,
But the motto you LIVE that counts!

EDUCATING FOR EFFICIENCY.

W. B. Hunter.

The prodigality of nature in bestowing the treasures of earth upon our country has been equalled only by our prodigality in expending them. But at last our eyes have been opened to the folly of such a course, and conservation is the hobby of the day. Waste of all kinds is being eliminated—sawdust, the bark of trees, weeds, even the smoke going up the chimney are called upon to give up their hidden store of value by man's ingenuity in solving nature's secrets. Scientific management has stepped in to prevent the waste of physical labor, and, by analyzing each task, seeks to conserve human effort. This is, perhaps, the most significant trend of the conservation movement.

Now, while this is indeed excellent and must needs obtain, it starts at the wrong end; that is, it takes a man whose process of thinking and acting are more or less fixed from years of habit and makes the most of them. Why not take him in his youth and train him to think and act on scientific management lines in school, instead of a hit-or-miss style of perhaps and maybe, as is now the case in most of our educational institutions? Instead of turning out a silk-gloved know-nothing, graduate a thinking mechanic or clerk or office worker, who has a place in the business world and can command a living wage immediately instead of requiring a post-graduate course in real business methods at starvation wages because of the blunders our present system produces.

What employer is there who has not vented his wrath at the products of our schools? Instead of being an advantage, their education is a real handicap; they must unlearn much of it and realize that available knowledge, hard work and efficient service are what count in business. How are you going to produce an efficient worker of this kind? This problem is being met satisfactorily by the co-operative form of industrial education formulated by Professor Schneider, of the University of Cincinnati, and adapted to the public high schools by the city of Fitchburg, Massachusetts, where it is in its fourth year of successful operation.

By this method a boy spends his four years in the high school with the idea of being a trained producer of definite standing at the time of his graduation. The first year is spent wholly at the high school, and the next three alternate weekly between shop and school. The shop apprentices the boy to learn the trade, and papers are signed by which the boy agrees to stay at the trade for three years, and the manufacturer binds himself to teach the rudiments of the trade, enumerated in these papers, which are necessary to equip the apprentice as a skilled workman. The school gives him a training of a definite nature; his studies apply to his work and give him information and practice that build up his intellect as a thinking mechanic. He does not study Latin, Greek or astronomy, but

English, mathematics, drawing, civics, physics, chemistry, mechanism of machines and office practice. His civic pride and moral fibre are cultivated. No worker can be a success who is not a good, clean citizen.

This is the school schedule:

Schedule of Studies of the Co-operative Industrial Course of the Fitchburg High School.

	Periods Per Week
First Year—All School Work:	
English and Current Events	5
Arithmetic, Tables and Simple Shop Problems	5
Algebra	5
Freehand and Mechanical Drawing and Bench Work	8
Second Year—School and Shop Work:	
English	5
Shop Mathematics, Algebra and Geometry	5
Physics	4
Civics	2
Mechanism of Machines	5
Freehand and Mechanical Drawing	6
Third Year—School and Shop Work:	
English	5
Shop Mathematics	5
Chemistry	4
Physics	4
Mechanism of Machines	5
First Aid to Injured	1
Freehand and Mechanical Drawing	6
Fourth Year—School and Shop Work:	
English	5
Commercial Geography and Business Methods	2
Shop Mathematics	4
Mechanism of Machines	4
Physics, Electricity and Heat	4
Chemistry	6
Freehand and Mechanical Drawing	5

Here, then, is a course that equips a young man for life's battle with the best of aims. He meets with problems in the shop, brings them to school, discusses and analyzes them, finds out best methods of manufacture, the feeds, speeds, etc., that are required to produce results. He studies the history of his trade and sees its connection with the prosperity and progress of his city and country. Work and education become co-operative. Instead of being educated away from work he is trained into it. Punctuality and responsibility are inculcated. He must obey the rules of

the shop as does any other workman. He has no special privileges and learns to work by working.

The apprentice receives wages for his labor at these rates: 10 cents an hour for the first year of 1,650 hours; 11 cents an hour for the second year of 1,650 hours, and 12½ cents an hour for the third year, making a total of 4,950 hours and wages of $552.75.

The poor boy, who otherwise could not afford to go to high school, although his father is taxed for it, is given a chance to get the kind of education that his future work requires, as does the boy who intends to enter the profession.

A trade school which offers no pay and lacks the commercial atmosphere of productive manufacturing cannot be compared to this plan. The city is given the use of millions of dollars' worth of up-to-date machinery costing the city nothing, while a trade school requires thousands of dollars for equipment, to say nothing of maintenance. The tax rate is actually lowered by the co-operative plan, for since half of the students are always in the shops, the capacity of the school is doubled. The cost per pupil in a trade school varies from $150 per pupil to $250. In the co-operative plan it is about $45. The boys are earning in the aggregate about $15,000 annually.

A strong feature of the plan is the fact that it takes a boy at a most critical period, the high school age, when he is as unstable as the weather, and keeps him steadily at one thing. After the two months' trial period which every boy spends in the shop at the end of his first year in school, which determines his aptitude for the trade in question, the percentage of those finishing the course is one hundred. This is not the case with other courses: they drop out all along the line and graduate about 33 per cent. of those who enter.

The business man and the manufacturer are actively interested in the schools under this plan, and instead of standing off and criticising the products he assists by advice and counsel, for now he has a boy working for him who attends the school, and he must pay attention to him. And the teacher, instead of pinning his faith to the classics and retiring to his sanctum for their perusal, has got to go out into the shops and see what is going on *now*. How can teachers who swear by a book written by a theorist who knows nothing about conditions that obtain in modern industry be competent to teach an apprentice who is producing goods that are selling in the world's market? The dust of the ages must be shaken off, and the eyes of our present and future teachers be opened to present needs, and a study of industry and business as it *is* substituted for the study of what *isn't* and never can be. In other words, educational methods must be put on a modern business basis.

How is the shop and school work correlated? By frequent visits to the shops on the part of the instructor, who is himself an experienced journeyman, and by written reports of week's work of apprentice in the shop. This forms the basis of the English work which deals largely with descrip-

tion and exposition of machines and facts connected with his work. He gives short talks on these, writes about them and learns to express himself clearly. He studies some of the better class of literature and keeps in touch with current events of the day. His mathematics, physics, chemistry and other studies are constantly referred to his shop work and he knows where he can apply his knowledge.

After four years of the plan, the first class graduating last year, there is no question of the success of its operation. Every one of these boys is at work at his trade earning from $2.00 per day upwards. Some are in training for foremen and some, about five in number, will enter higher institutions of technical knowledge next June. From a class of twenty boys the course now has over one hundred members, with twenty graduates, working at the following trades:

Machinist, patternmaking, drafting, sheet metal work, molding, saw making, office and textile work. They are employed by The Fitchburg Machine Works, Putnam Machine Co., Simonds Mfg. Co., Bath Grinder Co., Blake Pump Works, Fitchburg Steam Engine Co., Jennison Co., C. H. Cowdrey Machine Works, The G. M. Parks Co. and Parkhill Mfg. Co.

There is no limit to the application of this idea; all that is necessary is that any employer agree to take boys or girls in pairs so that while one is in the school the other is in the shop. It will work equally well for the mechanic, clerk, dressmaker or farmer.

Some of the reasons for the boys selecting this course on its inception will give an idea of their caliber.

I.—What induced you to select this course?

(1) "I selected this course as an advantage for future life. This course is instructive and profitable. The reasons in general are as follows: Because after I have graduated from the Fitchburg high school I will not be a loafer in the world. I will have a trade to fall back on."

(2) "I took this course because I always did like the machinist's trade and thought it a good chance to learn it and get an education at the same time."

(3) "I selected this course because I thought it would be of greater use to me than any other course in the high school."

II.—Are you satisfied with it?

(1) "I am pleased with the course because I get actual shop experience and the education besides."

(2) "Because it is instructive. Things that I thought never could be done have been realized before me, and in school the studies are very instructive, especially in mathematics. In this we study both shop and school."

III.—Please state in what particulars you are profited by the course.

(1) "It gives me money and helps me to be self-supporting. It gives us high school boys a chance to show that we are not afraid of soiling our hands. It also gives us a liberal education."

(2) "I am profited by the course financially and have learned more in this course while I have been in it than all I learned in three years of regular high school work."

(3) "If I had simply been apprenticed at a shop I might become a good machinist, but with our school work behind us I am sure we would have a great advantage over the plain machinist."

(4) "Through my association with practical men, thereby gaining practical knowledge along with the theoretical side at school."

(5) "It gives me money with which to buy clothes and while learning my trade, I am getting an education at the same time."

IV.—What do you intend to do after completing this course?

(1) "I intend to follow it up and understand a little of the large study of mechanics."

(2) "When I have completed this course I expect to go out as a draughtsman, machinist, or boss machinist."

(3) "I intend to keep on with the trade that I shall have learned by that time."

What does it do for the manufacturer? It gives him a better class of apprentices, boys who will make thinking mechanics, not mere machines who require all the foreman's time and attention explaining every little detail of a drawing. They will be able to read a blueprint and go ahead. Foremen on every hand speak in the highest terms of the work. The boys fit in with the men. They are three years ahead of the ordinary high school graduate; they are working in the plant where they would have to apply for a position if they wanted work; the men know what they can do, and when they become journeymen there is no kick about paying them good wages.

Let me read a few answers of the freshmen of school who have elected this course on the question: "Why did you select the Industrial Course?" which will show you the class of boys selecting the course.

(1) "I took the Industrial Course because I thought I would like it better than any other course, and when we get in the next class we work a week and go to school a week. The first year we work we get ten cents an hour, the second year we receive eleven cents, and the third we get twelve and a half cents."

(2) "In this course you learn to be industrious, and besides it shows what working in a shop is, and what going to school is. We work eight of the ten weeks in vacation to see how we like it, and if we don't like it by that time we can drop this course. The boys can be plumbers, machinists, sawmakers, and most every trade there is. The school week we have all kinds of shop mathematics which help us in the shop."

(3) "Reasons why I took the Industrial Course: I wanted to go to work during vacation and after, and not go to school, but my folks wanted me to go to school. We talked over the courses one night and didn't know which to take. I would take the General or Industrial. My brothers, who are machinists, said that sheet metal work was a good paying job, and if I could get that I had better take the Industrial Course. I planned to take it, and was glad I did, because I like arithmetic and algebra, and I do not like to go to lady teachers. Then when I work during next vacation I can see whether I like it or not, and if I don't, I can leave. If the work is just as good as school is, I think I'll keep on."

(4) "I took the Industrial Course because I thought it was a good course. In this course you go to school the first year all year. Then the second, third and fourth years you go to school one week and then work in the shop the next week. In this course you have a chance to help your parents and also to put yourself through school. The week that you work in the shop you are paid, and your pay is raised each year. When you graduate from high school you have a trade and an education too."

(5) "We should take the Industrial Course because it is essential for

one to learn some trade in order to make a living by it; besides we are taught other studies that would be of value in life, in this course. I think it is a good plan, as it is, to go entirely to school one year, which gives one a chance to see what the course is like, and also to determine whether or not he would work in the shop the next year, and also the following years during which he was taking this course. It seems to me that we should go to school as long as possible, and not go to work as soon as we get to be fourteen years old."

(6) "I took the course because I thought that it was the best course to prepare anybody to earn a living without going to college."

Now as a final analysis you will be interested in what boys who graduated this June said about the course at a meeting of the Merchants' Association of our cty:

One boy says: "I think at the present time not more than one-half to one-third of the students of the high school of this or any other city know what they are going to do when their school days are over. The other half either have to learn a trade or go into some store and there work some time before they can earn any sort of wages.

"Now with the industrial co-operative course, there is a way in which a student may learn a trade which will give him a living if he wishes to follow it. This course is so arranged that if the student wishes to go away to some higher school he may do so and he has only to take up a foreign language outside.

"I think that this course is about the best thing for a boy, as it gives him the knowledge that he should have, also the shop practice that even though he does not follow the trade, will come in useful to him in after life. I have heard many men say that if they had had the chance that we are having that they would not be where they are now."

Another boy says: "When the manual training course in the high school was dropped it became necessary for me to elect a new course and I elected the technical, not because I wished to, but merely as a poor substitute for what I had been taking. However, it was my good fortune not to have to start in that course, as the Industrial Course was started in this city at that time and I elected it.

"Immediately upon starting my work in the shop I felt the pleasure of really making something that was of commercial value. My work in the shop has consisted of drawing and tracing various parts of engine lathes, planers, driving-wheel lathes, steel tire turning borers, axle lathes, car wheel borers, and hydrostatic wheel presses. I have been also figuring out trains of gearing to be used in connection with belt drives and various motor drives to give the desired feeds and speeds, and also the width of face and pitch of gears to use to transmit a given amount of horse power.

"At school we talk over the problems of the previous week which have come to each individual in the various shops. We receive instruction in mechanical drawing, including machine design, gearing, cams, etc., mathematics, including algebra, geometry, applied mechanics and trigonometry,

chemistry, physics, English, business methods, commercial geography, and mechanism of machines.

"Taking the theoretical side of problems which we are taught in school together with the practical side which we receive in the shops, I believe any scholar completing the Industrial Course is better equipped to earn his living than any other high school graduate."

Another boy writes: "Dr. Charles W. Dabney, President of University of Cincinnati, says: 'The object of education is service and for service, the man needs not merely to be perfectly and completely developed in every part of his nature, but also thoroughly furnished and equipped, both with tools and with the skill to use them. We have all agreed that our schools have been for centuries too much absorbed in book work, in verbal studies which sought to train the memory and reasoning only, but which failed altogether to give adequate discipline for the eye and the hand or to fit the student for skilled labor and for practical life.'

"In the Industrial Course, however, the studies taken up during the school week are of such a nature, that they will be of most benefit to us after our school days are over.

"I would here like to repeat the statement in regard to the education we were receiving before taking the Co-operative Industrial Course, made by the members of this class, when they were the guests of the Iron Workers' Association. Many of us stated that before we took up this course we had no definite object in view in coming to school, but we came merely to get our lessons and get a good mark.

"The studies we have taken up during the past two years and which we are now following in more advanced form, have enabled us to form a definite idea of the work at hand which we will come in contact with in the future.

What does the parent and workman say?

One father, himself a machinist, says: "From my son's reports of his school and shop work I feel that he has had what mechanics ought to have and that is an education with their trade. I have worked at the machinist's trade for twenty-eight years and I know what an education would have meant to me."

Another parent says: "I take pleasure to assure you that I am of the opinion that the Co-operative Industrial Course is the best course that a young boy can choose who intends to work at the trade for which he may be adapted. The boys should feel proud of a city such as Fitchburg, where the proprietors of shops show such an unselfish interest in their advancement, by allowing them to use machinery and stock and pay them for their product.

"As a further proof of my faith in the course I have placed my second boy with you."

A third parent says: "I have noticed with great satisfaction the marked improvement my son has made during his three years' course.

"The lines along which he has been taught have tended to give him

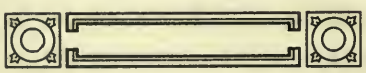
a quicker and keener perception of the principles of mechanical construction and operation. As he has been requested to work overtime on the school holidays in the office as draughtsman, leads me to believe that his work is valued by his employer.

"The fact that a certain fixed remuneration is paid a pupil for his services during the time he is engaged in acquiring the practical part of his education, acts as an incentive for him to put forth his best efforts and in many instances allows him to continue his schooling for a longer time. This plan instead of interfering with his school work induces him to attack his theoretical work with greater zest and earnestness, and as he is assured of employment upon completing this course of study it gives him a great advantage; he feels he is a worker and not a drone in the busy hive of humanity. I have been and am now a firm advocate of the Fitchburg plan of Industrial Education."

A foreman says: "The Industrial Course to me seems to fill a long-felt want, because it teaches the reason why. A boy does not have to do a thing arbitrarily. He is told or learns why he does it. I have had several boys under my care and find this true. They seem to take more interest in the shop work than the regular apprentice. I regret that I did not have the chance to take a similar course while attending school."

These are only a few of many similar letters from parents and workmen.

This plan is rapidly being adopted over the country and there is no doubt but what it is the solution of the skilled labor problem. The manufacturer gets skilled help, the worker because of his training commands more pay, the community because of intelligent citizens becomes a better place of residence. IS THERE ANY PLAN THAT CAN DO MORE?



Few things are harder to put up with than the annoyance of a good example

—MARK TWAIN

SHOP SANITATION AND WORKMEN'S EFFICIENCY.*

By Otto P. Geier, M. D., Cincinnati.

Successful industrial development has concerned itself largely in the past with the achievement of two ends. First, the acquirement of a highly efficient plant as to buildings and their efficient arrangement. Second, economic and specialized equipment for the manufacturing processes. In recent years the human element, the workman and his efficiency, has become the question of dominant consideration. The so-called theory of "scientific management" is to-day emphasizing the prime importance of the workman's efficiency and is establishing the principles by which that efficiency must be developed. Among these principles are:

First, the scientific selection of the man and his adaptability to the task; second, the development of the man to the performance of the maximum amount of useful labor with the minimum of fatigue; third, adequate economic compensation for its performance.

No workman is fit for any task unless he is first of all fit in body, therefore scientific management must include the establishment of such conditions of shop sanitation and hygiene as will promote and maintain the health and well-being of the workman.

Industrial Hygiene.

The term *industrial hygiene,* includes a clean shop, with plenty of sunlight and a continuous supply of fresh air at proper temperature—a shop with modern sanitary arrangements, lockers, toilets, drinking fountains and cuspidors.

Intelligent application of the principles of "industrial hygiene" will assure a better "personal hygiene" in the employee, which in turn will provide the employee with a resulting greater amount of energy to be used in scientific management.

Man's working efficiency depends upon the lasting efficiency of his mind and body. Efficiency of body and mind is affected by home and shop conditions. It follows, therefore, that shop conditions should be scientifically sanitary and hygienic. The manufacturer has possibly in the past failed to carefully analyze the detailed conditions necessary to perfect sanitation. Has he not overlooked the fact that in providing decent living conditions for them in his workshop during the working hours of each day, he automatically sets a forcible example for better sanitation and personal hygiene in the homes of his employees? Perhaps the time is not far distant when the manufacturer seeking the highest efficiency in his men, will not stop with perfect shop sanitation, but will find it to his advantage to go further and provide a systematic medical survey as to the health of his employees and the conditions under which they live, with the end in view of preventing illness in the individual and the spread of disease in the shop.

*From The Lancet Clinic.

In the personal campaign for funds that the Anti-Tuberculosis League made last year among the manufacturers, I was given the opportunity of seeing the viewpoint of the manufacturer towards the league. Desiring to formulate some intelligent plan of work for the league and attempting to have that plan reflect the value to the manufacturer of a crusade against tuberculosis, it occurred to me that the league might well undertake some experiments in a series of shops representing various industries with a view of demonstrating the economic value of "industrial hygiene."

A Bureau of Hygiene and Sanitary Instruction.

The Anti-Tuberculosis Leagues, wherever thoroughly organized, are attempting to instruct the public in the way of better "personal hygiene." This new plan of operation was conceived in the hope that we could show that "industrial hygiene" provided by the manufacturer leads to better "personal hygiene" in the employee, and that in the enjoyment of both, the employee earns more for himself, produces more in less time, and consequently reduces the burden rate per hour to the manufacturer.

One is impressed with the fact that the people at large do not appreciate the extent of the work that the Anti-Tuberculosis League has before it, nor do they feel the responsibility which they should bear towards the work. The manufacturer fails likewise to understand that he is the direct beneficiary of this campaign for better health.

The Anti-Tuberculosis League is really conducting a bureau of hygiene and sanitary instruction. Its field is much broader than its name indicates, and its work must result in a decided improvement of the general health, and therefore of the moral status of the community. When you teach a man the principles that underlie the prevention of tuberculosis, you have taught him the dangers of excesses of all sorts; you have taught him the value of fresh air, exercise and good food; you have advised him against alcoholism; you have warned him against spitting promiscuously on the sidewalks and in street cars, etc. In other words, you have given him the basic principles of "personal hygiene," which make for greater health and happiness.

Good Health a Definite Personal and Civic Asset.

A strong, healthy man is an efficient workman and to that degree the employer is receiving direct financial returns from the campaign of the Anti-Tuberculosis League. Its ultimate result will be to keep busy many a machine now idle because of the preventable illness of the employees now manning those machines.

A better appreciation of the value of good health for itself will alone raise the standard of efficiency of any workman. Improved personal cleanliness and better health make for a greater self-respect in any individual, and tend to improve his family relations. Betterment of civic health makes for happier homes, and healthy and happy homes are fundamental structures upon which the commercial advancement of any city must largely be built.

Every individual of a community is directly concerned in the health of the tenement districts. As long as disease of infectious nature is allowed to flourish there the middle class and the leisure class are subject to the dangers of these same infections, no matter how perfect their personal hygiene may be. The interdependence of the human family is no more strongly exhibited than in this question of health. It is strange how few people, comparatively, are interesting themselves in this health propaganda when one considers how directly and selfishly every one is affected thereby. It is even more surprising that the employer of labor, usually so acute to his own advantages, has not recognized its value to him before this. Physicians have always been the most active in the campaign for better health and are found bending their best energies in the direction of preventive medicine. From a worldly viewpoint it is bad business for the physician to encourage the very activities which make for the reduction of sickness and, therefore, his income. From an economic standpoint, it is good business for the business man to encourage those agencies which have for their purpose the improvement of the general health of the community. This work is most needed and is largely done among the laboring class and the good health of the workmen is a definite asset in any business. If the employer of labor would more thoroughly inform himself about some of these social economic questions, he would often be appalled at his findings and be a ready and generous contributor to these agencies for good.

To successfully interest the average business man, the proposition that you put before him must show direct and definite profit for himself. Sporadic, well-meaning efforts at welfare work by the manufacturer have failed so frequently that one must approach the employer with a plan which assures to him a direct profit and which also assures him of the co-operation of the employee. I believe that the proposed plan of having the Anti-Tuberculosis League begin a survey of shop conditions, with the idea of instituting "industrial hygiene," is one which meets the conditions above referred to.

The Proposed Industrial Survey.

To successfully conduct such a survey would require a group of experts, working in harmony, to establish certain facts. It would require: First, a physician and hygienist, by whom and under whose direction the exact physical condition of all employees of a plant would be recorded; second, a ventilating engineer to plat the physical condition of the workshop. This to include exact measurement of light, heat and ventilation supplied.

Under the direction of both the physician and the engineer, the condition of the atmosphere in the shop would be studied to determine the temperature, the approximate amount of humidity, dust, CO_2, obnoxious gases and vitiating smells that obtain in a given shop. Exposing bacteriologic plates for varying intervals would assist in determining the purity of the air supplied to the workingmen. Such other conditions, as expectoration

on the floors, provision of cuspidors, sanitary toilet facilities, installation of drinking fountains at convenient points in the shop, etc., would also be noted.

A critical review such as this, would be followed by suggestions to the employer and the employees. A comprehensive plan of procedure toward improvement of shop conditions would be placed before the employer. He would be shown just what percentage of his men were physically defective, and which of them should be removed for their own sakes and to prevent contagion to others. The employer himself could judge from the report just to what extent the imperfect conditions found had likely contributed to absenteeism, to general lassitude, apparent lack of interest, etc., in his employees, and therefore to a higher cost of production.

Fresh Air as a Factor in Production.

Many a manufacturer feels safe in the belief that his shop has a perfect system of ventilation and yet on analysis this would be found to be incorrect. Many so-called perfect systems, installed at great expense, make for dead pockets of air in certain portions of the room. The very even temperature at which air is delivered makes for lassitude in the employee. Humidity, obnoxious odors and CO_2, of course, but add to the discomfort. It seems reasonable from a physiologic standpoint that heating systems should imitate as closely as possible the *ideal* out-of-door atmosphere, which is never a still atmosphere. A fairly warm day becomes an ideal one merely by the addition of slight air currents. The movement of air brings with it invigoration and stimulation. Why not attempt this result indoors by intermittently introducing into the rooms, by the proper mechanical device, currents of unheated or less heated fresh air? The slight variation in temperature would stimulate the energies of the workingmen and their interest in the work before them, and, at the same time, improve the ventilation by causing currents between the warm and the cooler air. This would obviate dead pockets of air in the room. In an attempt to imitate out-of-door conditions, as referred to above, an automatic by-pass is to be installed in a large heating plant at a near date and should throw some light on this subject.

Probable Resultant of Industrial Survey.

Assuming now that the employer believes it to his advantage to follow the suggestions made by the ventilating engineer and physician, the next step in the plan is taken by the league in the instruction of the employees as to personal hygiene and securing their full co-operation in carrying out the spirit of the new hygiene in the workshop. Wherever indicated, the League's representative will visit the homes of the men. It goes without saying that the cases of tuberculosis will have been removed after the initial medical survey of the men, the sociologic factors of those families recorded and some humane disposition made of the patients afflicted with this disease. The number of physical defectives in any shop will be

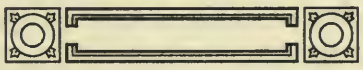
influenced by the occupation, condition of shop, home environment, climate, etc., but the number of employees needing advice will be proven to be very considerable.

Under the proposed plan, a medical survey of all employees would be made at stated intervals after the inauguration of industrial hygiene in the shop. Corresponding periods, before and after the introduction of hygiene, will be compared, to arrive at figures showing relative absenteeism, illness, interest and efficiency of employees, production, etc. These tables alone would prove the economic value of industrial hygiene, but it seems fair to assume that they should show an increased efficiency of from 1 to 10 per cent., depending again upon the conditions obtaining before the experiment was begun. The first year's saving ought to be sufficient in most cases to pay for the experiment.

The problem of knowing the exact physical status of every employee becomes a live one when considered in connection with workmen's compensation acts, already introduced in some States and being agitated in many others.

Would it not pay the employer to know what physical defects in the employee may contribute to an accident, and thus take measures to prevent the same?

It seems reasonable to suppose that these proposed reforms in shop sanitation are problems the solution of which should originate with the employer, rather than with the employee, since the employer is in far better position to handle it more intelligently and effectively than the employee, who, sooner or later, will be forced to agitate politically for these sanitary conditions in the shop. It should be borne in mind that the appeal for better shop conditions need not base itself only on humanitarianism, but must be recognized as a live factor in scientific shop management of the future.



A man without a sense of humor is like a two-hinged door with the top hinge gone: It sags a little.

INDUSTRIAL HYGIENE AS A FACTOR IN HUMAN EFFICIENCY.*

By Irving Fisher, Professor of Political Economy, Yale University.

Few will dispute that we live in an age of change and that of all the many changes now in progress one of the most significant is the change in our attitude toward waste. Although men have talked of political economy and domestic economy for four or five generations, it is only recently that we have faced the really great practical problems of economy; and this is especially true in America. We have counted it our good fortune to dwell in a land where nature has been so prodigal that we have not needed to fear want. We are only beginning to realize that this very prodigality of nature has produced a spirit of prodigality in men.

It is the purpose of the conservation movement to rebuke and correct this national trait and the resources of science are now concentrated in a mighty effort in this direction. The importance of conserving the food supply from our soils, as well as our supply of waters, minerals and wood, has, under the leadership of President Roosevelt, taken a deep hold on the popular imagination.

A beginning has thus been made in the movement to check the frightful *wastes of production* which have been disclosed. There is also an effort being made to eliminate the *wastes of exchange* through more "scientific management." But important as are productive and business economics, still more important is what has recently been called "Vital Economics." The conservation of human life will, I believe, constitute the grandest movement of the 20th century.

Not only do human beings constitute by far the greatest part of our national resources, but the waste of human life and strength is by far the greatest of all wastes. In the report of President Roosevelt's Conservation Commission, although his commission was primarily appointed to conserve our natural rather than our vital resources, it was pointed out that human beings, considered as capitalized working power, are worth three to five times all our other capital, and that, even on a very moderate estimate, the total waste or unnecessary loss of our national vitality amounts to one and a half billions of dollars per year.

Moreover, and this is the most important point, this waste may be checked by an expenditure ridiculously small compared with the economies attainable. For instance, a sanatorium for the treatment of tuberculosis, of which I am secretary, has recently calculated the costs of the institution during the six years of existence, and the returns on this cost. About $200,000 have been expended in treating patients, and there have been already earned by cured or improved patients discharged over $300,000; and these discharged patients still retain in potential working capacity, estimated on a very conservative basis, a capital value of over $1,500,000. In other words, the expenditure of $200,000 has within six years created a value of about $2,000,000; or $10 for each dollar expended.

*Read before the Academy of Political Science in the City of New York.

One of the Rockefeller funds is now engaged in a fight to overcome hook worm disease in the south. Our War Department has already exterminated this disease to a great extent in Porto Rico at a cost of 54 cents per patient, and this has probably produced, on the average a restored earning power of more than this cost every day of the life of the restored victim.

Similarly great results have been reaped on the investment of installing municipal water supplies in Pittsburg and other places, in the prevention of deaths from typhoid fever.

But in order to properly conserve our vital resources, there will be necessary a revolution in (1) our habits of living, (2) our public guardianship of public health, (3) and our conditions of labor. All three of these changes are now in progress. The anti-tuberculosis movement, the housing reform which goes with it, the playgrounds movement, and the various dietetic movements and investigations exemplify the changes slowly taking place in our habits of living. The rapidly increasing expenditures for municipal and state boards of health, the consequent reduction in mortality from infectious diseases, as well as the movement for a National Department of Health, are examples of improvements in the public guardianship of health. Finally, the movement for factory sanitation, for shorter hours of labor, for protection of workmen against accidents, for workmen's compensation and insurance, are examples of the improvements taking place in conditions of labor. These conditions are already vastly different from what they were when the first Factory Acts were passed in England two or three generations ago. We may also believe that the rate of improvement is greater today than ever before. Professor Henderson in his recent book on Industrial Insurance in the United States remarks that it is impossible to bring his book fully up to date because improvement is taking place faster than the record of it can be revised.

The two fields in which the public most realize the need for improvement in conditions of labor are the labor of children and of women. The premature employment of children, especially if, as is usually the case, they are over-fatigued, means a shameful sacrifice in the working efficiency of the budding generation. And the employment, under improper conditions of women, especially of married women, means an even more serious waste of life and strength for future generations. In spite of all the agitation on these important subjects, little practical reform has as yet been accomplished, as compared with what is necessary from the standpoint of industrial efficiency. Adjustments come slowly, even in these times of rapid change, and the slowest adjustment of all is the adjustment of those legal conditions which it is one of the purposes of this association to study. When we consider that many of our judges still declare that the laws passed to restrict the labor of women are unconstitutional on the ground that in the musty law books of the past (the heritage of the unsanitary ages of the past) there can be found no precedents to justify a discrimination between men and women, we realize how sadly the law is behind the

times, and how dearly we have to pay for the neglect of our ancestors to recognize by proper legal usages the physiological difference between man and woman. Personally I have little doubt that improvements in industrial hygiene could add at least one, and probably two, decades to the expectation of life of workmen. That this is not an unreasonable inference will, I believe, appear to anyone who familiarizes himself with, (1st) the mortality and morbidity among the industrial classes, (2nd) the known preventability of this mortality and morbidity, and (3rd) the prevention already accomplished, especially in other lands than ours. We need industrial hygiene in every department of industry, but particularly in certain dangerous trades. We need to follow the examples of Germany and other countries in providing greater safeguards against accidents on railways and in factories. We need also to follow their example in a more adequate control of industry in the dusty trades, particularly where the particles of dust are hard and angular,—as in the grinding of needles. We need also more stringent regulations in regard to the chemical trades. Few things have been more humiliating to public spirited Americans than the failure of the United States Congress to pass the law for a prohibitive tax on the poisonous match industry—a law approved by the match producers themselves, and one which has been made in practically every other civilized country.

I have already implied that the United States is, in many respects behind foreign nations in regard to industrial hygiene. This was evident to visitors this summer at the great International Hygiene Exhibition at Dresden. An American expert and student of the prevention of accidents stated to me at this exhibition that there was no comparison between what Germany is doing and what is as yet even seriously considered in the United States. In fact, at the Dresden Exhibition the United States was the only civilized country which had no official representation. How little we as a nation as yet appreciate the value of modern hygiene is illustrated by the fact that a considerable number of our citizens can be misled into believing that a National Department of Health would endanger "freedom." So long as we allow "freedom" to stunt the growth of our children; to adulterate the foods which we eat; to advertise immoral and unhygienic nostrums; so long will we continue our high death rate and disease rate.

In order to accomplish all which ought to be accomplished in industrial hygiene, or even in order to catch up with other nations, we must invoke the aid of every agency which can promote this result. These agencies are partly governmental—the passage of laws regulating conditions of labor and the better equipment and administration of public health agencies,—partly voluntary—efforts of the employers of labor and of the laboring classes themselves. Public opinion, the activity of the public press, the pulpit and the public school can also co-operate. Personally I strongly incline to the opinion that some of the greatest strides healthward will be taken in the future through the activity of employers and em-

ployees, particularly in their combinations, the labor unions and the trusts. There are doubtless evils of labor unions, as is constantly pointed out by the capitalistic classes and there are doubtless evils of trusts, as constantly pointed out by the consuming and laboring public. These evils are such, however, as can be better dealt with by regulation than by disrupting either labor unions or trusts. I believe the time will come when this will be distinctly recognized and that instead of attempting to destroy either of these great and delicate mechanisms we shall endeavor rather to put them in harness and to compel them better to do their share of the world's work. Both of them are even now great factors in promoting the health of employees. Labor unions are doubtless in many instances acting on fallacious theories and in extreme ways. Like a man instantly out of prison, they must needs in their first gropings, make mistakes, before they "find themselves." But they are already working along certain lines and in which they have achieved and will achieve results important to humanity. In my opinion, the salvation of labor lies largely in industrial hygiene, and so far as labor unions help industrial hygiene, they deserve the commendation of all who have the good of humanity at heart.

Such few experiments as have been made in shortening the work day indicate that a maximum output can be secured by a shorter work day than that usually employed.

At Liege, it was found in a sulphuric acid establishment similar to a foundry that shortening the working day from eleven hours to ten, from ten to nine, and so on gradually down to seven and one-half resulted in each case in an increase of the output.

In 1899 the owners of the great Zeiss optical goods factory at Jena, Germany, introduced the eight-hour day and then made careful records of the results. In 1903 it was announced that although the aggregate number of hours worked had decreased 15 per cent. the output per hour had increased 16.2 per cent. An instance in which the eight-hour day superseded the nine-hour day with entire success is the case of the Salford Iron Works, of Mather & Platt, at Manchester, England, which changed to the eight-hour day in 1893.

It is not maintained that in all cases productivity will be as great in eight hours as in nine. Cases to the contrary could also be cited. The point to be insisted upon is not that it is profitable to an employer to make the work day shorter, for often it is not, but to show that it is profitable to the nation and the race. Continual fatigue is inimical to national vitality, and however it may affect the commercial profits of the individual it will in the end deplete the vital resources on which national efficiency depends.

Many of the railway accidents are traceable to over fatigue through very long hours of work; and statistics show that accidents to employees in factories increase rapidly, as the late hours in the evening approach. An unduly long day is bad economy, for the fatigue which it ultimately produces, causes serious accidents. I believe that in general the hours of labor are, physiologically speaking, too long.

In these directions the labor unions have already secured some results; not only directly through the education of their members as to the prevention of tuberculosis through the establishment of sanatoria, and other medical institutions; but as a potent force for the passage of laws requiring better factory sanitation, the improvement of the labor conditions, and the shortening of the work day.

It is interesting to note that among the agencies which tend to improve labor conditions, are those organizations of capital commonly supposed to be directly opposed to the interests of labor,—the so-called "trusts."

As already indicated, I am one of those who believe in the regulation but not the disruption of trusts; and I believe that one of the most hopeful signs of the times is found in the fact that the trusts are engaged in a far sighted effort to benefit their employees. I do not mean to imply that pure philanthropy plays any great role in this movement, and indeed were this the fact, we could not expect it to be permanent. Philanthropy enters in only to a minor degree and generally because of the fear, on the one hand, of public opinion, of boycott, or of strikes, if conditions of labor are unsatisfactory and because of the hope, on the other hand, of public approval and patronage, if the conditions of labor are satisfactory. It is self interest which leads the employer to care for the employees.

The Coleman Mustard Company of Norwich, England, have, it is reported, never had a strike, or any other kind of labor trouble because of fifty years of humanitarian and far sighted treatment of their employees, with provisions for playgrounds, lunch-rooms, suitable lunch hours, and working day,—and all apparently without any attempt to exploit these conditions for the mere purpose of advertising. The American Iron and Steel Institute, representing over 95 per cent. of the steel industry of the United States, has instituted a Committee on Welfare, under the charge of the former Commissioner of Health of New York City. The steel plants have entered on the work on a colossal scale, having already spent several million dollars in improving water plants, drainage, privy-vaults; installing shower baths, and playgrounds; distributing literature for the instruction of employees in how to eliminate flies; and establishing prizes for the best kept gardens, as well as providing apparatus for the prevention of accidents. The motive in making these improvements is to increase the labor efficiency of the men, decrease the absence from work on account of illness, diminish the number of unnecessary deaths, and keep abreast with the general movement for industrial hygiene now taking place among industrial establishments. Some years ago the Bureau of Labor of the United States showed that there was much room for improvement in the conditions obtaining in the steel industry in the United States, and the improvement then indicated is now in process of accomplishment.

The Life Insurance Companies are entering this field not only for the benefit of their employees but also for the benefit of their far more numerous policy holders. No other agency except governmental agencies can compare in importance with this. It crowns the efforts of voluntary and business organizations and offers us assurance that in the future the conservation of life will be recognized as our greatest business interest.

THE VOCATIONAL BUREAU OF CINCINNATI.

Discussion by Mrs. Helen Thompson Wooley, Director of the Cincinnati Vocational Bureau.

At the recent meeting of the National Society for the Promotion of Industrial Education there was a series of papers and discussions on "What Can be Done for the Factory Worker through Industrial Education." Mrs. Helen Thompson Wooley made a valuable contribution to the informal discussion, and it was the privilege of Human Engineering to make a verbatim report of her account of the notable work being done by her and her associates in the Vocational Bureau established for children leaving the public schools to take up employment.

What made this work possible in the first place was the enactment of the child-labor law which was passed in July, 1910. This law came about largely by the agency of Professor Dyer, assisted by some of our public spirited and interested members of the school board. The feature of the law which made it possible for us to begin our researches is the requirement that the children shall receive working certificates when they first take employment, and that every time they take a new position during the entire period during which working certificates are required of them, they shall report to the certificate office. In order to receive such working certificate the child must be fourteen years of age and must have completed a satisfactory graded test. In addition to that he is required to return to the office and have his certificate endorsed each time he gets new employment. This gives us, as you see, the opportunity of following the work of the children for at least two years.

The general plan of this investigation is that we make a five years' comprehensive study of the work of children in Cincinnati, and that we at the same time make a similar investigation of children of corresponding age who remain in school, so that we may compare the results as observed in the working children with those who remain within the school system.

I have indicated very briefly the various departments of the work. Each one has its schedule and its own method of procedure, and I will present each in turn.

First, let me refer to the work of issuing certificates. For each of these certificates we make three cards. One is a card from the school, signed by the applicant's teacher or principal, certifying that he has passed the fifth grade and has been given marks in all school subjects. This card also states whether the child has had manual training, or domestic science; what his conduct and industry at school have been, and whether he was punctual. Another of these cards contains the birth certificate of the child, which wherever possible comes from the church where he was baptized, or from the records of the Board of Health. In case none

of these records is available we are obliged to accept the parent's or guardian's affidavit. A third card is from the employer of the child, stating that he intends to employ this child in a certain occupation; and the child is not allowed a certificate until he has the employer's agreement that he is to go to work. These cards, of course, are all filed separately for each child, and are a part of the records of the certificate office itself; but for the purposes of our study we get all that material on a card of our own, which I will call here "Schedule No. 1."

I have here a sample card which has been filled out. I will read it so as to present a concrete illustration. It is headed "Study of Cincinnati Working Child, Schedule I. No. M 1650; date of birth, June 26, 1897; birthplace, Cincinnati. Creed, Roman Catholic; priest, Rev. Edmund Klein. Occupation ———; father dead; mother cleans in office building; school attended, St. Michaels, Madison, Ind.; first communion, spring of 1911. Grade, V; standing: Reading 95; spelling, 95; writing, 90; English grammar, 90; geography, 88; arithmetic, 90. School attendance record, 34 weeks. There is an item on the card "Special Training," with subheads "Manual" and "Domestic Science." This child states she has had training in Domestic Science. Conduct, good; application, good; punctuality, absent six days on account of sickness. Remarks: "Girl attended one week this September at Raschig School." On the other side of the card we have a few questions which give us information not required for the certificate itself but having an influence on the state of the child. The questions are these: "What schools have you attended?" This child attended St. Michael's at Madison, Ind., one year, one week in Raschig, and six years in St. Francis, Cincinnati. "What studies do you like best?" Spelling and history. "What studies do you like least?" Geography. "Were you absent often?" No. That corresponded with the child's school record. "Why have you left school?" Mother needs help, and had a position offered. There is a question on the blank regarding work before the age of fourteen, before school, after school, and whether running errands, selling papers, peddling, boot-blacking, or what other occupation; also, earnings. There is a question, "Why are you going to work?" to which the answer was before given. The child really preferred to leave school regardless of the family's necessities, which we find to be a fact in a large proportion of cases. Additional space is left on the blank to answer particulars as to the father and mother. In this case the father was a German-American, the mother is an American. English only is spoken in the home. The mother works out. We always inquire whether the mother is the chief wage-earner, and if she does any work outside of the home. In this case the mother is a wage-earner and works at cleaning office buildings, as recorded on the other side of the card. We ask also as to the number of rooms occupied, which in this case is three; and whether there are any lodgers living with the family. In this case there are none. This comprises our "Schedule No. I." It is taken at the office when the child comes for his certificate.

Schedule II is our physical examination, which is inadequate, but we

have not yet found any way of remedying the inadequacy. Each child who goes to work ought ideally to be put through a thorough physical examination by a competent physician; but you all know the opposition which exists in the minds of the general public to physical examinations when they are forced. This opposition is not confined to the laboring classes. We find it among university students. We have thought it inadvisable therefore, to insist upon sending these children to the physician in charge of a school, although that should be done. Each school in Cincinnati has a physician appointed by the Board of Health who is responsible for that school. This is true not only of our public schools but of our parochial schools. The district physician is the medical supervisor of the schools in his district; and the Board of Health would be willing to have this work done. It is only because we know the opposition that would arise that we have not yet put it into effect. The result is, our physical examination is only the superficial one that we can make when the child comes to the office. In making the certificate we enter the child's name, number, sex, height and weight. We take what we can of the family history; the number of children in the family, how many brothers, how many sisters, living or dead. The child under consideration has two brothers and one sister, and is the third child in the family. We inquire the condition of the mother's and father's health. The mother's health in this case is good. The father is dead. Then we ask as to certain diseases that are likely to modify the family health and about which we ought to know. We ask whether any one in the family has suffered from rheumatism. Here the answer is "Aunt on father's side has it." We also inquire as to cancer, tuberculosis, and heart disease in the family. We make notes of any signs of disease which are apparent. We take the personal history of the child and inquire as to mumps, measles, whooping cough, scarlet fever, diphtheria, typhoid fever, pneumonia, and general health during the past year. This child reports whooping cough at the age of two years, scarlet fever when an infant, smallpox at five years, and during the past year trouble with right ear. Under the head of "present condition," we note color and inquire as to earache, headache, eyes, cough, expectoration, night sweats, sore throat and fatigue. This child reports ringing in the ears, no headache, cough only with colds and sore throat, appetite good and that she does not easily fatigue. We never get a negative answer to the questions whether the child's appetite is good and whether he fatigues easily. They all report ravenous appetites and no sort of fatigue, which is a bit suspicious. All we can do in the examination of physical conditions, is to look at the throats, examine the teeth, observe whether they have adenoids, whether the cervical glands are enlarged and measure their chest capacity. We do that with a tape-measure during inspiration and expiration. We take their temperature, pulse rate, examine the spine, note the posture, the feet and the state of the skin, as to eruptions or rash. Such observations are limited and do not require professional training. We are doing our best and know it is far from being

ideal. This child's report shows the tonsils negative, adenoids negative, left anterior cervical glands enlarged, thyroid gland negative, teeth badly decayed. Bad teeth are found in 99 per cent of the children we examine, and we are trying to make an arrangement by which we can send the children to a dental clinic in Cincinnati to prevent, if possible, the loss of their teeth. This child's mucous membranes are normal, gums normal, chest, 71; inspiration, 76; expiration, 68; vital capacity, 1,800; pulse rate, 88; temperature, 99; spine straight, posture good, feet normal, skin clear, and no rash. That is the extent of our physical examination. I wish it were more comprehensive.

Perhaps the necessity or the wisdom of making a psychological examination of these children needs explanation more than any other portion of the investigation. Mr. Bloomfield, as you remember, in his book on "Vocational Guidance," considers such laboratory tests of doubtful value, because, he says, the children are in an abnormal frame of mind, knowing that they are undergoing a psychological examination. They are frightened by the strangeness of the procedure and are out of personal relationship with the one who makes the examination. Our experience has not confirmed this assertion. I believe that Mr. Bloomfield himself has not conducted such examinations. At any rate we find that the children are easily interested in the tests, and like to do their best; they have a feeling much as adults have upon coming into a laboratory and seeing these things,—they like to see how well they can do. We have had comparatively little trouble from nervousness. One of our number who is helping with the work impressed me by a remark made upon this point. She was given a brief explanation of the method of taking and tabulating these psychological tests, and keeping a record of them on these schedule cards, and has done this work for about four months. She has not yet examined the children in the laboratory. After working for a few weeks she said, "I now feel that, after going through the results of the psychological examination, I know something definite about a child's mental condition." This statement of hers was, of course, gratifying to me.

It is true that we get in the school reports a general statement of the child's mental ability; but such reports are not analyzed in any way, and we cannot draw from them any definite conclusion as to whether the child will probably succeed in a given occupation. The psychological examination that we make, however, seems to have this chief value—that it throws some light upon the question of the child's ultimate aptitudes.

The points that we try to bring out in our psychological tests are as follows: In the first place, we test the state of bodily control of the child in several ways. We test the strength of his hand, the rapidity of movement that he is capable of, and the rate of fatigue under steady movement, the steadiness of his hand, and the perfection of his muscular co-ordination. I shall scarcely have time to describe the apparatus that we use and the methods pursued for arriving at results; but those of you who are familiar

with psychological laboratories will understand what I mean when I tell you that we use a dynamometer for testing the grip of the right and left hands respectively; that we use the tapping test to ascertain the degree of the rapidity of movement and the rate of fatigue; that we use, to ascertain the standard of steadiness, an apparatus with a small hole in which the child holds pencil, and a card-sorting test for co-ordination. We examine also the condition of the eyes and ears. This we do roughly, and our examination reveals nothing more than the fact of abnormalities if they exist. We make an examination with Snellen's test types to determine the acuteness of vision and we ascertain whether the child is afflicted with hyperopia or myopia. Our test for auditory accuracy is ascertaining the distance at which the ticking of a watch can be heard—not a wholly satisfactory test. What we desire to learn are the pronounced abnormalities which may be expected to affect the child's usefulness, and especially his capacity for accuracy of observation.

With regard to his mental powers, we test his immediate memory, his ability to remember and set down a series of digits of different lengths; also his learning power, by means of what is called a substitution test. The tests are designed to reveal the rate at which the child can learn, which of course is not always co-ordinate with a good immediate memory. We try also to give two tests which bear upon the range of ideas and the command of language possessed by the child. He is required to write the word opposite in meaning to each of twenty words, and his ability to form sentences is tested in various ways.

The particular child whose physical and general schedules I have read to you, came out of this psychological test somewhat in this way. Vision, abnormal, only .04 with both eyes. With the right ear she can hear the ticking of a watch at a distance of 150 centimeters, which is normal, but with the left ear only at a distance of 20 centimeters. Her grip is average for a girl, with the right hand 22.05 kilograms, with the left hand, 21. She has a good rate of movement, that is, she moves her hands fairly fast; good muscular control in that respect, but fatigues rapidly. Her immediate memory is fair; her steadiness is poor. Her perceptive power is not good. She is exceedingly inaccurate, sacrificing accuracy to speed, which brings a bad result. The tests show poor command of language. The range of ideas, correct formation of sentences and co-ordination are poor.

I might give you one or two illustrations of the way in which I have used the laboratory for vocational purposes. I wish to say that I have done it in only three cases, although I have been put on the program as "Director of Vocation Bureau." In only three instances have I even estimated as yet the applicability of this information to the problem of vocational guidance. One of those was a girl eighteen years of age, who left school at twelve. Her family regarded her as nervous, and for that reason they had taken her out of school. The child was disinclined to work. She answered ordinary questions with ordinary intelligence. Miss Campbell could not

make out whether she was worth special effort, and sent her over to me to test her and see what I thought she could do. I discovered within a comparatively short space of time—it takes about an hour to put a child through the tests—that she had exceedingly poor muscular control and bad co-ordination. Her memory was wretched, her perceptions inaccurate, and her learning power poor. Her range of ideas was limited, far below the average of a fourteen-year-old child. I felt convinced that she was unfit for any occupation requiring steady work or concentration of attention. I thought the only kinds of work for which she seemed possibly fitted were the simpler kinds of housework, with plenty of variety. Miss Campbell made the recommendation to her family that she should not be put to any trying occupation. Unheeding, they put her into a factory, where she lost her position in one week. We discovered afterwards that this backward mental state was due to epilepsy, which was made more active by her factory experience. Now that was a thing which could not have been learned in an ordinary interview, or from a family history alone, because in such cases the family are not generally willing to tell these things.

The second case which was sent me was a child who was being considered for a task where great accuracy was required. The child was expected to paste samples in a book which was to be used by tailors—one of those big books containing samples of cloth, which had to be arranged in a certain order and so pasted in a book. Each sample of cloth had to occupy exactly the place assigned to it in the book, or otherwise the work would not come out perfect. If errors were made the book was spoiled, which meant the loss of a considerable amount of money, as each book was considered worth $15.00 when completed. Miss Campbell had no way of knowing whether the child she had under consideration would succeed in such work, and she sent her to me to find out whether or not there was any probability of success. She was an exceedingly inaccurate child as was shown by various tests. She did not follow directions. So I was able at least in that case to prophesy probable failure.

The third case was that of a small child who had gone to school two years, apparently making no progress. I soon discovered in her a state of great mental retardation. She was in about the condition of the average three-year-old child. Some poor public school teacher had been laboring in the interest of that child and had doubtless been blamed because the child did not get along. I recommended her to the school for defectives, where she is now doing fairly well.

These are the only cases where I have attempted to apply this knowledge at all. Of course it awaits further testing.

Our fourth schedule is one which embodies the industrial history of the child. When the youngster comes back after changing his position we try to find out certain facts about his occupation. This card contains the the name of the industry, kind of work engaged in, hours of employment, overtime, earnings, whether time, piece, how the child came to find the employment, his reason for leaving and the employer's reason for his leaving.

On the reverse of the card there is provision for a record of each job as to various items. We always ask them what they have done in the intervening time between leaving one job and taking another, whether they have stayed at home loafing, or have occupied the time in looking for another position, or were sick; what they did with any unoccupied time. We inquire whether the work at which they were engaged fatigued them much at first, and whether they afterwards became used to it; what the child did with his earnings, how much he gave to his mother, and how much his mother gave back to him for spending money; whether he is trying to learn a trade, and if not whether he would like to, and if so what trade he wishes to enter. We try to find out anything we can about his aptitude for a particular trade. We inquire whether he is continuing his education in any way. Children who have finished the eighth grade are not required to enter a continuation school. We find out whether the child is attending any sort of educational class, and whether there is any relation between his educational class and the kind of work he is doing; whether he enjoys his work and what he does with his free time; finally whether he would prefer some sort of combination work and school to mere work or mere school. This record is made each time the child's position is changed.

The next schedule about which I wish to tell you is the home visiting schedule which is just being worked out. We have no printed forms yet, but the information is recorded under the following heads: First, the name and number of the case; then the neighborhood, which in the case of the child whose schedules I have been reading you is a good German residence neighborhood. Next the home, which in this case is a tenement, three rooms on the third floor front, kept in good order, clean, well furnished and lighted. There is a dining room and sitting room combined. Next the family, which is five in number; no lodgers; four children at home; one child dead; father dead; mother works out cleaning and is never at home in the evening. The children are at home in the evening except when the oldest girl (twenty years of age) "Goes out with her company." The children have had the usual childhood diseases, and two girls had smallpox; no other serious illnesses. Four wage-earners at present, averaging about $18.00 total income per week. Rent, $11.00 a month. The food costs $10.00 a week plus what the children at work pay for ten and fifteen cent lunches each day.

With regard to food, by the way, I have been much interested in Miss Boswell's report of the replies to her questions on that subject. She says that the average family of these working children spends about $2.00 a week a person for food for the family, and that in cases where that sum was much diminished she found a poor, discouraged and anemic looking lot. She gets the information from the home about the child herself, namely, that she has had scarlet fever, measles, whooping cough, and smallpox. The scarlet fever left the child's ears in serious condition. Through the influence of an aunt, a trained nurse, she was treated by a specialist, but is still slightly deaf. She did not care for school, but goes

to continuation school on Saturday. She takes a great deal of responsibility at home, and prepares the supper. She gives her earnings to her mother, keeping only ten cents a week for spending. She likes to spend her evenings sewing. The concluding portion of the card is devoted to the attitude of the mother to the child. In this case the notation is, that the mother is interested in the child, but expects a great deal of assistance as her right.

We have one other department of research, that is, visits to the place of occupation. About this department I can say comparatively little. We have made small headway as yet. The plan is to visit each place of occupation and to make as many notes as possible about the conditions of the occupation itself. The schedule is now being worked over, but is not ready to present in any detail.

This gives you an outline of what we are doing, and the scope of our study. It may seem to you that it has very little bearing upon the topic of this afternoon's program, which is, "What can be done for the factory worker through industrial education?" Although at present it has no direct application, we believe it may have eventually an important bearing not only on problems of industrial education but on those of vocational guidance as well. It was interest in these two problems which prompted this research, and our feeling is that we will obtain a great deal of information that will help in solving questions that now present themselves concerning child labor, and the conditions surrounding it. It is always impossible to say what one may be able to do, what application one may be able to make of facts after they are obtained, what inferences one may derive from them or what principles are involved; but I can tell you what we hope to do with the information we are collecting. We hope to make some sort of statement as to the effect various occupations have upon the children who enter them. I might present this a little more clearly, by using Professor Schneider's classification of occupations, as "enervating" and "energizing." An energizing occupation under his definition would be one which stimulates and enlarges the life of the individual engaged in it, whereas an enervating occupation is one which has the reverse effect. Professor Schneider says that he takes as a type perhaps of the most energizing kind of occupation, that of a locomotive engineer, who is engaged in a calling that keeps both mind and body constantly alert, supplies him with fresh air, relieves monotony by presenting ever changing scenery and views of nature and adds to this a mental stimulus from the attention requisite to many details, combined with a high degree of responsibility. The type of enervating occupation is factory work, in which the individual stands all day repeating the same motions under comparatively unhealthy surroundings, and with very little variety of interest. Between these two extremes there are all sorts of intermediate occupations, but Professor Schneider tries to make a rough classification of them into one or the other of the two general heads.

With the material we are collecting we might make such a classifica-

tion more scientifically because we would have actual facts as to each occupation, as to its effect on the worker in enervating, or energizing; and we could base upon these ascertained facts our findings as to the effect on the children who are employed for a certain number of years in these occupations.

Aside from being able to classify the occupations we would also be able to make some suggestions as to what might be done to do away with undesirable effects produced on the individual workers, and to assist in decreasing the present fearful waste of human efficiency. What these suggestions might be we are not of course in a position to say. We ought to be able to answer thereby the question of what special preparation ought to be demanded of the child for certain occupations.

It has been found that a certain percentage of children degenerate into a class termed "unemployables." We think we ought to be able to find out why there is such a class and of what type of children it is composed. We should answer the question whether this degeneration into the unemployable class is the fault largely of poor preparation, of the conditions surrounding the occupation or is the result of improper home conditions.

There is also the question of how we can best help children to find work fitted to their natural capacities and their training. We feel sure already from the result of the investigations that have gone forward that the facts we are collecting about each child will contribute greatly toward his vocational guidance.

Let me give an illustration which rather forcibly appealed to me. A boy who was obviously in bad physical condition came to us, and if we had depended on an examination from that viewpoint alone, we should have felt inclined to refuse him a certificate; but we made an investigation as to the home conditions, and discovered that the child was being exploited at home. There were other children in the family who were working, and they felt resentful that this one was not at work. As it was probable that he would be abused in case we prevented his going to work, it seemed wiser to try to get him some occupation in which he would be less injured from regular work than he would be by his exceedingly trying home conditions.

From the employer's side we might be able to help in many cases where there are special requirements, for we can, I feel confident, select children whom our tests will show to be suitable for a given occupation.

ELECTRICAL INJURIES.

The Treatment of Electrical Injuries and the Use of the Prone Pressure Method of Resuscitation From Electric Shocks and Drowning.

CHARLES A. LAUFFER, M. D., Medical Director Relief Dept., Westinghouse Co.

Dr. Charles A. Lauffer, the director of the relief department of the Westinghouse Electric & Mfg. Co., is a recognized authority upon this topic. He has summarized his conclusions drawn from daily practice in two valuable articles published in the "Electric Journal" for February, 1911, *and in the "Central Station" for September,* 1911.—EDITOR'S NOTE.

The general use of electricity for lighting and the common employment of high tension currents in industrial plants, street railway systems, and in general for transmission of power, makes it advisable that the attention of employers should be directed to spreading the knowledge of the best methods for treatment of electrical burns, shocks, and other injuries.

The usual injuries encountered in the industrial applications of electricity are due to exposure to flashes and to actual contact.

Symptoms of Flashed Eyes.

Eyes which have been exposed to electrical flashes become very red, due to the sudden dilatation and congestion of the blood vessels of the mucous membrane lining the lids and in part covering the eyeball, known as the conjunctiva; such an inflammation of it constituting a conjunctivitis. The pain is intense, there is an aversion to light, and a copious secretion of tears.

Often the eyelashes and eyebrows are singed, and charred hair, skin debris and dust particles may fill the eyes, contributing to the severity of the above symptoms.

In the more severe cases, in addition to the conjunctivitis, there may appear around the central transparent area of the eyeball, known as the cornea, a zone of red; such a zone of red in the white of the eye, near its junction with the colored part of the eye, known as the iris, constitutes an iritis. It is characteristic of a congestion of the blood vessels within this portion of the eyeball. If the heat of the flash is sufficient, as in the more severe cases, the superficial layers of the transparent cornea are coagulated.

Treatment of Flashed Eyes.

The immediate treatment consists in washing the region of the eye and the eyelids with eye-water*, then washing the eye itself. Upon dropping into the eyes a sufficient quantity of three per cent. cocaine hydrochloride solution, the debris may be mopped out with clean cotton

*A serviceable formula for eye-water is as follows:

R Sodii biboric	0.30
Acidi boric	0.15
Alumini sulphatis	0.06
Zinci sulphatis	0.06
Aquae Camphorae	30.

M.

Sig. Use freely as an eye-wash.

wrapped on a toothpick. The coagulated tissue of the cornea is similarly mopped off.

The immediate relief of pain is secured by cold compresses over the eye, and the chief remedy in the subsequent treatment is cold compresses—merely cotton or a clean cloth laid on ice, or made wet in ice water, and changed by the patient every two minutes. The cold compresses serve to contract the dilated blood vessels, and thus control the painful congestion. They can be employed for an hour at a time, as the patient lies down; not constantly, but every other hour. This enables the patient to get some sleep, for flashed eyes are most painful when he is relaxed and ready to sleep. Eye-water is used every hour. In severe cases adrenalin hydrochlorate, 1:5000 solution, is used every half hour; atropine sulphate, one per cent., solution, a few drops every four hours to control the iritis referred to above, if this symptom manifests itself. Also it may be necessary to apply castor oil every two hours to prevent the eyelids and eyeballs from growing together (synechial adhesions) if the corneal tissue has been much injured. In the milder flashes the three latter remedies are omitted, as the patient wears smoked glasses and returns to work in two or three days. Recovery is prompt and complete in practically all cases.

It is conceivable that high intensity flashes are capable of seriously affecting the optic nerves in susceptible cases, though such a case has never come under our observation. The fire of the flash that singes the hair or burns the skin is but one element in the production of this type of injury, as eyes may be "flashed" and present the congestion, lachrymation, pain and aversion to light (the cardinal symptoms of flashed eyes) when the person is too remote from the heat of the flash to be burned. The intense light of the electric welding arc will produce a similar conjunctivitis and iritis; the effect probably being due to the ultra-violet rays present in the electric arc. However, the red and blue glasses worn in the helmets of the welders protect them from the high intensity light.

Symptoms of Flashed-Skin.

Flash burns of the skin are usually burns of the second degree. That is to say, while destroying the outer layer of skin (the epithelium) they do not injure the inner layer of the skin (the corium) nor the deeper tissues. At first these burns may present a mere congestion; the skin is red, as from exposure to the sun, and they have the appearance of a first degree burn, scarce worth while dressing and bandaging. But there is pain, some redness, and by the second day huge blebs or blisters may have formed. Usually the hair is scorched; often the outer skin is blown off, and the surface looks ragged. Under proper treatment of these cases there is seldom any formation of pus, and they will heal up, usually without leaving a scar. We have treated many such burns with the happiest results. We have treated men whose features were so altered by burns and the eyes so badly swollen, that their own mothers would not have known them. To the uninitiated it seemed they were scarred for life, yet

within two weeks they were able to resume work, and within two months no trace of their burns was discernible.

Treatment of Flash Burns of the Skin.

The immediate treatment of flash burns consists in securing the highest obtainable degree of surgical cleanliness with ethereal soap* applied with numerous cotton sponges (using sterilized absorbent cotton such as is sold for medical uses) and the application of sterile gauze dressing, well covered with Unguentine. We find this ointment uniformly reliable; it soothes the pain and promotes recovery. A loose gauze bandage is applied and the part put at rest.

The subsequent treatment consists of daily redressings. When the blebs are large, we scissor them open freely, but allow the outer skin to remain for some days, as it is in itself a splendid protective covering.

These burns must be washed clean, then there is little liability to infection with its pain, the formation of pus, and the resulting long term of disability. But should it become infected and pus form, we at once trim away the skin debris, so as to allow no pockets for the retention of infection. In the absence of infection; that is, when the pus-producing bacteria do not invade the wound, the dead skin is removed within a few days, after the inner sensitive layer of the skin has had a chance to harden somewhat, and to lose its hypersensitiveness. When the healing has progressed we sometimes apply ten per cent. Ichthyol in Petrolatum, to facilitate the formation of normal skin. After recovery, in most cases, the skin remains red and sensitive for some weeks. We instruct the patient to wear canvas gloves and otherwise protect the new skin from grime and weather, as it is prone to eczema.

The dry, open method of treating such burns, namely, that of powdering on stereate of zinc freely and exposing them unbandaged to the air, is more or less successful in hospital practice, but not adapted to ambulatory patients, especially those who may live on the streets and in dirty houses, and who may return to work before complete recovery.

Symptoms of Flashes From High Voltage.

In contrast to the usual benign burns from low voltage is the severe burning from high voltage flashes, causing destruction of all layers of the skin (third degree burns) over large areas. Great mental excitation, even transient mania, is sometimes observed in these cases; again, on the contrary, some patients are relaxed, unconscious, not breathing, and may require immediate resuscitation by artificial respiration.

*A good formula for ethereal soap that dissolves and removes the dirt and grease at the same time rendering the area antiseptic consists of:

Suphuric ether	4 oz.
Turpentine	1 oz.
Alcohol	3 pts.
Surgical soft soap	4 lbs.
Water, enough to make	1 gal.

Treatment of High Voltage Flashes.

These are hospital cases, and they may require much care to ensure their recovery. Delirium is sometimes encountered. Where large areas are burned there is increased danger from sepsis. When convalescence is established, skin deficiencies are restored by grafting. In such cases the recovery is slow. Scarring will be more or less extensive, depending on the depth and extent of the burns and the infection that may be associated.

Prevention of Electrical Flashes.

Careful attention in handling switches and plugs is imperative. Circuits should be opened whenever practicable during tests and in repair work, and danger signs erected, as well as isolating the test by means of ropes. In repairing of transmission lines and transformers connected thereto, the lines should be thoroughly grounded at the point of repair on any side from which power may accidently be thrown on. Attention to such details as every electrician knows, but sometimes ignores, will do much to minimize the number of these injuries. With sleeves rolled up to the elbows, no gloves, and the face near a switch when it is opened on a circuit carrying a heavy load, the exposure to flash burns is unnecessarily increased.

Great caution should be observed in approaching live high voltage conductors, and a safe distance maintained. Even the high voltage of switchboards has been known to jump some distance, envelope a man in its flaming discharge, seriously burn him, and violently throw him down. High voltage should never be disregarded under any circumstances. It should be respected.

Causation of Flash Injuries.

Flashes of arcs occur upon breaking or momentarily short-circuiting direct and alternating currents, as, for example, where a switch in a heavily loaded circuit is opened by mistake, where wires with deficient insulation become crossed, or where a workman at a switchboard allows his screw-driver to slip, causing a short circuit. A score of ways there are that will cause a sheet of flame to issue forth, surprising even the experienced, but more often the novitiate.

Although electrical flashes are of but momentary duration, the heat developed is often very great. This great heat will produce painful burns of the unprotected skin and eyes. Similar burns may also result from continued exposure to the rays of the electric arc as used in welding, though the operator may not have been near enough to feel any intense heat. Such burns usually do not become apparent till several hours after the exposure. Eyes can be flashed by the welding arc at a considerable distance.

Such is the origin of the mild flashes ordinarily observed and readily amenable to treatment; then there are the severe burns from high voltage conductors.

With a voltage much in excess of 15,000, a man seldom makes contact,

for the voltage jumps over to his fingers, flexing them, and making it impossible to make contact; 33,000 volts will leap through ordinary insulation and go to the man who approaches it. The discharge is instantaneous, and takes place before he can make actual contact with the conductor, unless he is thrown upon it. On this account there is less liability to contact burns from high voltage than from low voltage. The discharge that bridges the interval between the circuit and its victim may cause extensive face burns. Such a flash is but a leakage from the high voltage conductor, and to the extent that it spends its force on the surface, there is diminished liability of serious electrical shock.

The man approaching the high voltage conductor sinks as if shot when the discharge strikes him. Although the conditions may be such that he will receive a heavy current, the discharge may carry with it only a small current, yet enough to flex his arm and leg muscles (the flexors are stronger than the extensors) and cause him to fall all over himself. Such precipitation assists in extricating him from what might be a dangerous contact, whereas in a lower voltage, with hand grasping the conductor, the excessive electrical stimulation of his muscles causes his grip to tighten; his fingers flex tetanically; he is unable to release his hold.

The flashes from high voltage may moreover carry sufficient current to cause a suspension of animation—to be considered later.

Contact Injuries.

The two types of contact injuries are shocks and burns. The passage of an electric current through the human body may cause a momentary unpleasantness, the retention of the victim within the circuit unable to release himself, a suspension of consciousness, during which he falls, but revives again, or a suspension of animation, requiring artificial respiraton.

Resuscitation by Artificial Respiration.

The efforts at resuscitation must be begun the instant the patient is freed from the contact. Sixty seconds is too long for preliminaries. The comrade nearest him must know how to give artificial respiration, as loss of time in summoning a physician is unpardonable. The services of the latter are often essential in winning back a life nearly extinguished, but the artificial respiration must be begun early, and perseveringly continued, if the life is to be saved.

While the heart beats there is hope. Artificial respiration helps sustain the cardiac action. Even when no radial pulse is felt, the comrades are not justified in ceasing their efforts at resuscitation, as the heart may still be beating feebly. In those occasional cases, where the heart action has ceased, as the physician upon his arrival may determine with his stethoscope, there will be no possibility of restoring the normal respiration by any method of artificial respiration. Yet the victim should have the benefit of any doubt, for there are few cases of accidental electrocution where the victim cannot be restored from the electrical shock, if appropriate immediate efforts at resuscitation are instituted.

Rules for Artificial Respiration.

The three essentials of the Prone Pressure method* of artificial respiration to be remembered and practiced in anticipation of an emergency are:

I.—The man is laid upon his stomach, face turned to one side, so that the mouth and nose do not touch the ground.

II.—The operator kneels, straddling the patient's hips, or kneels by either side of the hips, facing the patient's head.

III.—The operator places his spread hands upon the lower ribs of the patient and throws his own body and shoulders forward, so as to bring his weight heavily upon the lower ribs of the patient.

The operator's downward pressure should occupy about three seconds, then his hands are suddenly removed. Squeezing the chest in this manner forces the air out of the lungs. On release of the pressure the elasticity of the chest walls causes them to expand, and the lungs are refilled with fresh air. This act should be repeated an indefinite number of times at the rate of twelve times a minute. In the excitement of the occasion the danger is that the rate will be too rapid. If the operator is alone with the patient he can adjust the rate of giving artificial respiration by his own deep, regular breathing; if more persons are present, a watch can be used to advantage to regulate the rate.

Any evidence of returning animation should encourage the operator to continue his efforts. It often requires one-half hour to two hours. In electrical shock seldom over one-half hour, but in cases of drowning, especially, it is advisable to keep at it, for recoveries are alleged to have resulted after three hours of continuous artificial respiration.

Supplemental Efforts.

If the operator is alone with the patient, the artificial respiration is his chief concern, and offers the only hope for the victim. Yet if others are present they may keep the crowd back, loosen tight neckbands, if any, and hold a cloth saturated with Aromatic Spirits of Ammonia near the nose. As a respiratory stimulant it is even more useful than oxygen, yet is valuable only as an adjunct to the artificial respiration.

The physician upon his arrival, should the respiratory function continue in abeyance, may render great assistance by the hypodermic administration of Atropin Sulph. gr. 1-100 and Strychnin Sulph. gr. 1-30, which can be repeated at his discretion, or he can stretch the sphincter muscle.

Injudicious assistance is often harmful. No liquids should be given by the mouth to an unconscious patient. Under conditions met with in electrical shock, and in those near-drowned, liquids given are more liable to enter the lungs than the stomach.

When the rhythm of the respiration is re-established and consciousness is restored, the patient may experience thirst and may be encouraged

*See Journal American Medical Association, Vol. LI. No. 10: Collier's, Vol. 41, No. 25: The Electric Journal, Vol. VIII, No. 2 and No. 8: The Medical World, July, 1911.

to drink a teaspoonful of Aromatic Spirits of Ammonia in one-half glass of water, and the same repeated after a short interval. He may be cold and weak and in that case will require blankets and artificial heat; or he may be strong as ever, in which case it helps wake him up to allow him to walk with assistance a reasonable distance to the physician to have his accompanying burns dressed.

Yet a word of caution is here necessary. When artificial respiration has succeeded and the patient is recovering from the electrical shock, he may be excited and may desire to stand up too soon. He must be dissuaded from doing so until fully out of the shock—his heart and breathing fully restored—before he is permitted to sit up, and finally stand up. He needs watching for some time. If he gets up too soon a second effort at artificial respiration may be unavailing; it may be the collapse of heart failure.

Forethought.

Suspended animation requires instant relief, yet so often many who have been trained to give artificial respiration are helpless in such an emergency. Many are excited, frenzied; all turn white. Some jump up and down, others scream, and are incapable of intelligent action. With deliberate, prudent forethought, akin to the German Bureau of Strategy, each individual must study out in advance just what he would do under given circumstances—if his home or factory were on fire, or a comrade were on an electric circuit. Every action must be carefully thought out in advance. Testers should know if the floor is a non-conductor, and should know the location of switches that may be opened, or the methods of pulling a man off by his clothing, or otherwise, in such a manner that the rescuer is safe. Then he must previously study out and know how to give artificial respiration, so that there will be nothing unforeseen, nothing unanticipated, in an apparent calamity that spreads consternation particularly among those not qualified to meet the responsibilities of the situation.

Advantages of Prone Pressure Method.

We adopted the Prone Pressure method because: (1) It is easy to learn. Any intelligent man can be shown in a few minutes, and can practice on his friends, and they on him, until he becomes an expert in the art of giving artificial respiration. (2) It requires no apparatus. There is no delay due to waiting until an emergency outfit is found. (3) It can be carried on easily by one person. A mere boy of twelve can resuscitate an overweight adult and maintain sufficient inflow and outflow of air (tidal air), as much as he would secure were he able to breathe voluntarily. One operator can work without exhaustion for an unlimited length of time by this method; there is no need of team work, and teams working in relays, as for example, the Sylvester-Laborde method. Hence, there is diminished temptation to quit too soon. (4) Spirometer tests show the Prone Pressure method superior, as exhibited by Prof. E. A. Schafer of Edinburgh before the American Medical Association. (5) It is the method that best meets the complications of suspended animation as

encountered in electrical shock: (a) In the usual excessive relaxation of electrical shock, there is great liability of swallowing the tongue with the patient on the back, and considerable difficulty in holding it forward; by the prone pressure method, with the man on his stomach, the tongue falls forward of its own weight. (b) In the frequent bronchorrhoea (excessive secretion from air-passages) and edema of the lungs (leakage of blood-stained serum into air-vesicles) by laying the man prone on his stomach, these secretions run out of the mouth, and there is no danger of drowning the man in his own secretions. By the older method, where this complication was successfully met, the patient had to be rolled on his stomach occasionally to permit of the escape of bloody mucus, then rolled on his back, and the secretions churned up in his lungs until the artificial respirations are another time interrupted by rolling him on his abdomen to let the secretions escape from his mouth. (c) In cases of electrical shock presenting muscular rigidity a continuous rigid contraction of the muscles, tetanic, his arms cannot be manipulated; by pressure on the ribs, according to the prone pressure method, and simultaneous pressure on the abdomen by a second comrade, mucus is expelled from the mouth within a brief period, and with the first forced expiration there comes a general muscular relaxation and continued artificial respiration leads to recovery.

Theories of Electrical Shock.

Physiological experimentation on animals adduces the conclusion that in suspended animation (cessation of respiration and cardiac action) from electrical over-stimulation the brain loses its power to react to stimuli. This irritability (power to react) is only temporarily suspended, so that life, if not entirely extinct, is dependent on artificial respiration until such time as the brain (the central station) recovers its irritability.

Like the dry cell battery of a common door bell, which, if rung too continuously, ceases ringing; so the brain, if over-stimulated to the point of exhaustion, suspends vital operations. The dry cell left to itself recovers, and the bell will ring again; the brain possesses infinitely greater power of recovery. But artificial respiration must be employed to supply oxygen, so that oxygenated blood may help sustain the cardiac function, else there will be no interval of rest allowed the exhausted brain in which to recover.

While the irritability of the brain, which subsides immediately after the shock, will within a few minutes recover, everything depends finally, where artificial respiration is employed, on whether the action of the heart continues or not.

A second theory is that of asphyxiation, or the non-oxygenation of the blood. There is heightened chemical activity from the current that induces the electrical shock and much carbon dioxide is produced.

The excess of carbon dioxide in the blood paralyzes the respiratory center of the medulla. In asphyxia artificial respiration is required, and must be continued until the blood is oxygenated, before the normal respiratory function will be re-established.

A third theory makes electrical shock depend upon a sudden dilatation of the great vessels of the splanchnic area. The blood vessels are held in a state of tonic constriction by nerves of the sympathetic nervous system. The shock is conveyed from the cerebro-spinal nervous system to the sympathetic. This tonic constriction of the splanchnic vessels (those of the abdominal viscera) is suddenly recalled, suppressed, and in a moment these vessels dilate to twice their normal diameter, able to contain four times the quantity of blood normally contained, and the man in shock is liable to die of hemorrhage into his own vessels. Paradoxically, he can die of hemorrhage in this state without shedding a drop of blood.

Respiration will cease at once from anemia of the medulla; the brain depends for its blood tension on the tonicity of the vessels of the splanchnic area. Not only will the brain be without blood, but the heart will have no blood to impel into the arteries, and unless artificial respiration is resorted to instantly, the increasing asphyxia will speedily result fatally.

I believe that all three theories are interdependent, and that in addition there may be other factors.

Symptoms of Contact Burns.

The burns from electrical contact are generally of the third degree; that is, there is a destruction of both layers of the skin, and even of the deeper tissues. The real extent is not immediately apparent. The tissues are coagulated, and there is a deep white slough that is slow in separating. At times, fingers are burned to a cinder, or the vascular supply so destroyed as to cause a dry gangrene. These burns are as a rule painless, and upon recovering from the shock the patient may not consider himself burned, but later the discovery is made. In the milder forms they may not report for treatment until some days after the accident, by which time the burn has become infected. But these burns are worse than they look and are obstinate to heal, especially after infection sets in. Ordinarily, in the milder cases, the patient is best treated while continuing at work. In the severer degrees, as above mentioned, they are hospital cases.

Treatment of Contact Burns.

The immediate treatment in case of such burns consists in surgical cleanliness, secured by ethereal soap applied with numerous cotton sponges. For the milder burns, we prefer depletol, or 10 per cent. ichthyol on sterile gauze, to facilitate the separation of the necrosed (dead) tissues. When the slough has separated, we commonly employ balsam of Peru as a dressing, and alternate with thymol iodide at times. When crusts form under this mode of treatment, we employ zinc oxide ointment, to remove them, and continue the daily dressings until the defect has granulated in and the area is covered with healthy skin.

The severer burns in hospital practice are treated by open, dry or wet methods, in accordance with the ideas of the surgeon on the particular service. It is customary to be conservative in waiting for gangrene to demark the necrosed tissues, rather than to resort to immediate amputa-

tions, inasmuch as the boundaries of the damaged tissues cannot be immediately determined. Burns of the palms which to the uninitiated may seem trivial, may necessitate the amputation of the hands, due to necrosis of the tendons.

Factors in Causation of Contact Burns.

There is a wide variety of external and individual conditions that influence the extent of electrical injury, and there is an interdependence of circumstances that make tabulated results and reports of accidents apparently inconsistent. At one time 110 volts are involved, and there is a fatal accident; at another time 15,000 and recovery will ensue.

The voltage being equal, alternating current is probably less dangerous than direct current. With alternating-current frequencies below 50,000 cycles, and equal voltage, more response is produced than in frequencies approaching 100,000 cycles per second.

High frequency currents, even though of high voltage, such for example as are produced by X-ray induction coils, and also that of wireless telegraph apparatus, are not ordinarily dangerous, on account of their tendency to seek the surface of conductors in their circuit, rather than flow by way of internal path.

While burns and electrical shock are often associated, it is noteworthy that in many cases of accidental electrocution, there are no demonstrable burns.

Tabulated figures on the electrical resistance of the human body vary greatly. For example, by the bridge method on the Baker Static Machine the hand to hand resistance on various individuals was found to be 40,000 ohms (min.) to 140,000 ohms (max.). Moistening the hands cuts the hand to hand resistance to 29,000 ohms, immersing the hands in water reduces it to 5,400 ohms, and making the water conductive by the addition of salt, further reduces it to 4,600 ohms.

While approximately 15 ampere of current is used for criminal electrocutions, with electrodes at base of brain and calves of legs, yet 1/10 ampere may become dangerous under certain conditions of contact, and ½ ampere is considered prohibitive.

A current that is harmless at first, by breaking down the skin resistance and taking an internal path, may become dangerous.

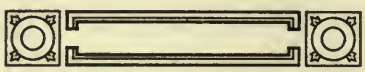
The location and number of contacts is an important factor, as well as the duration of the contact. "A small current applied over the pneumogastric nerve in the neck would paralyze the heart, but not if taken through the hands or body; the path must be over the nervous mechanism controlling the respiratory and cardiac centers to produce death." But it can be argued the electric current follows the blood vessels, not the nerve trunks; oil is a non-conductor, the nerve trunks are chiefly fat, the saline constituents of the blood make it a good conductor.

Panic (the emotions), causing profound vasomotor paresis and vascular dilatation from slight injury, and subsequent failure in performing arti-

ficial respiration, probably accounts for many deaths. A defective heart is also a possible cause of death, where there are fatalities and little current is involved.

It can be contended that electric current does not kill in most of the deaths attributed to it. Some of these deaths are undoubtedly the result of neglect; resuscitation is delayed, improperly conducted, or discontinued too soon. An electrician in our plant within six years in his own department has rescued six from death's door, six out of six, a record of 100 per cent. saved. He is there within three seconds, and begins the artificial respiration in the spot where they fall, and keeps by them in that spot until they have fully recovered. He is enthusiastic for the prone pressure method.

This outline sketch of electrical injuries is designed to emphasize the curability of this type of accidents, and to encourage everybody to learn how to give artificial respiration by the prone pressure method, with the purpose of minimizing the number of fatalities from electrical shock.



The less wit that a man has, the less he knows that he wants it.

—UNKNOWN

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AMERICAN INDUSTRIES

July—Safeguarding Factory Machinery, Luther D. Burlingame.

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Relief Tendencies in the United States, Ferd. C. Schwedtmean.

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AMERICAN MACHINIST

July 20—Has "Scientific Management" Science? A. Hamilton Church.

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September 21—Industrial Education in Wisconsin, E. B. Norris.

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July—The German Drift Toward Socialism, William C. Dreher.

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IRON AGE

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September—Fire and the Skyscraper, Arthur E. McFarlane.

METROPOLITAN MAGAZINE

July—Servants—or Domestic Labor? Elizabeth H. Westwood.

OUTLOOK

August 26—Business Men in the Making, Frank Marshall White.

September 2—Psychology and Business, H. Addington Bruce.

September 16—Ca' Canny and Speeding Up, George Frederic Stratton.

September 23—The Work That Kills, Earl Mayo.

SATURDAY EVENING POST

July 22—The Servant in the House, Maude Radford Warren.

September 9—Our Canadian Cousins—Profiting by Our Mistakes, Albert J. Beveridge.

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SCIENTIFIC AMERICAN SUPPLEMENT

July 15—Fire Prevention, Edward V. French.

August 5—Measuring the Laborer's Worth.

SURVEY

July 1—Fire Waste, Powell Evans.

The Risks of the Ore-Diggers, Don D. Lescohier.

July 15—The Fire Wall An Essential, H. F. J. Porter.

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The Lumberman's Hazard, Don D. Lescohier.

Workmen's Compensation: Would the Best System for General Welfare be Constitutional? Miles M. Dawson.

August 19—Master and Men, Paul Lupke.

The Social Program of the National Electric Light Association.

Labor Legislation, John B. Andrews.

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Some Work-Hazards Which Go Into a Loaf of Bread, Don D. Lescohier.

September 23—The Brass Moulder's Secret, Emery R. Hayhurst, M. D.

British National Insurance Bill, Henry R. Seager.

Labor Legislation, John B. Andrews.

September 30—Wage-Earning Women in Stores and Factories, Anna E. Nicholes.

SYSTEM

July—Work-Accidents and the Employer, E. M. Atkin and H. M. Edwards.

WORLD'S WORK

July—Practical Profit-Sharing and Its Moral, George W. Perkins.

August—I Our Losing Fight Against Fire, Edward I. Croker.

The Practical Public School, Frank Lawrence Glynn.

The Money Value of Training for the Trades, Charles Dillon.

September—II Our Losing Fight Against Fire, Edward F. Croker.

Accidents due to swift-moving machines and their automatic rational prevention, William T. Manning, M. D. (No. 2) 79
Alexander, Magnus W. An annuity system for employees (No. 2) 63
Annuity system for employees, An, Magnus W. Alexander (No. 2) 63

Bad air problems, Russell Spaulding (No. 1) 9
Bancroft, Edgar A. Loss from accidents (No. 1) 5
Bangs, John Kendrick. On file (No. 2) 68
Because he could handle men (No. 1) 29
Birdseye, Miriam. The suggestion system (No. 1) 14
Bolling, Raynal C. Provision for the safety of employees—United States Steel Corporation (No. 4) 209
Bonus system, The. Warren S. Stone (No. 1) 15
Boutell, A. A. Profit-sharing in Detroit (No. 1) 20
Brandeis, L. D. Workingmen's insurance (No. 3) 109
Brittin, Emma S. Two years of successful welfare work (No. 2) 80
Brittin, L. H. Review of report on condition of women and child wage earners in men's ready-made clothing industry (No. 3) 134
Brown, George W. Sanitary, safe and comfortable working conditions (No. 2) 60
Burgess, Frank. Labor efficiency betterment (No. 2) 69
Burlingame, Luther D. Factory safeguards (No. 2) 46
Business Men's group of the Society for Ethical Culture (No. 2) 45

Carhartt, Wylie M. A practical experience with the forty-eight hour week (No. 1) 20
Charities and Corrections, National Conference of, Marie V. Smith (No. 3) 182
Child study (No. 1) 32
Clark, Irving, M.D. The Norton Company's medical department (No. 4) 230
CO_2 air test a fallacy? Is the (No. 2) 42
Conservation of vision. Ida B. Hiltz (No. 3) 114
Continuation school, The Cincinnati. B. B. Quillen (No. 4) 227
Co-operation. Harry D. Thomas (No. 1) 8
Co-operative industrial training as a way to efficiency, Robert T. Hill, Ph. D. (No. 3) 165
Cottrell, L. W. "Concerning Courtesy" (No. 2) 78
Courtesy, "Concerning." L. W. Cottrell (No. 2) 78

Dyer, Frank B. Industrial education in Cincinnati (No. 2) 75

Editorial (Nos. 1, 2, 3, 4) 2, 38, 102, 190
Educating for efficiency, W. B. Hunter (No. 4) 241
Efficiency (No. 1) 33
Electrical injuries. Charles A. Lauffer, M.D. (No. 4) 268
Employers who demoralize system (No. 3) 133

Factory safeguards, Luther D. Burlingame (No. 2) 46
Fire damp detector, New (No. 3) 181
Fisher, Irving. Industrial hygiene as a factor in human conservation (No. 4) 254
Forty-eight hour week, A practical experience with the, Wylie M. Carhartt (No. 1) 20
Fresh air as a speed boss, C. E. A. Winslow (No. 3) 173

Geier, Otto P. Shop sanitation and workmen's efficiency (No. 4) 249
Gilbert, Royce W. What Boston and New England are doing for the promotion of industrial economics (No. 2) 41
Goldmark, Josephine. Standard working hours (No. 3) 150
Grieves, W. A. Mutuality (No. 2) 50
Guest, Edgar A. It doesn't pay (No. 2) 59
Guillet, Cephas, Ph. D. Points and hints from Weyl's hygiene (No. 1) 22

Hammond. Mrs. John Hays. Women's welfare department—National Civic Federation (No. 4) 207
Hill, Robert T., Ph. D. Co-operative industrial training as a way to industrial efficiency, (No. 3) 165
Hiltz, Ida B. Conservation of vision (No. 3) 114
Human engineering, A study in, Winthrop Talbot, M.D. (No. 1) 3
Human preservation institute, A (No. 2) 71
Hygiene, Points and hints from Weyl's, Cephas Guillet, Ph. D. (No. 1) 22
Hygienic window, The, Winthrop Talbot, M.D. (No. 1) 16
Haldy, F. G. Some principles underlying a successful suggestion system (No. 2) 86
Halstead, Albert. An innovation in British wage scales (No. 3) 184
Ham, A. H. Conference on the loan shark evil (No. 3) 156
Ham, A. H. National Federation of remedial loan associations (No. 3) 161
Hamilton, Alice, M.D. Occupational diseases (No. 3) 142
Hunter, W. B. Educating for efficiency (No. 4) 241

Industrial accidents in the United States (No. 3) 186
Industrial Betterment, Preliminary directory of firms who have established methods of, E. E. Pratt and Winthrop Talbot, M.D. (No. 2) 95
Industrial economics, What Boston and New England are doing for the promotion of, Royce W. Gilbert (No. 2) 41
Industrial education in Cincinnati, Frank B. Dyer (No. 2) 75
Industrial hygiene as a factor in human coservation, Irving Fisher (No. 4) 254
Industrial service and research, Bureau of (No. 4) 192
Industrial service of the Kanegafuchi Spinning Co., Sanji Muto (No. 4) 195
Innovation in British wage scales, An, Albert Halstead (No. 3) 181
It doesn't pay, Edgar A. Guest (No. 2) 59

Jacobs, H. W. Santa Fe efficiency system (No. 3) 106
Juvenile employment in Birmingham (No. 1) 13

Kanegafuchi Spinning Co., Industrial service of the, Sanji Muto (No. 4) 195
Kanegafuchi Spinning Company of Japan (No. 3) 186
Klink, Jane S. Service department in a small business (No. 3) 117

Labor efficiency betterment, Frank Burgess (No. 2) 69
Labor statistics, World's (No. 3) 108

Lauffer, Charles A., M.D. Electrical injuries.....(No. 4) 268
Learning a new process, Florence H. Tresilian, M.D.....(No. 1) 21
Loan associations. National Federation of remedial, A. H. Ham.....(No. 3) 161
Loaning of money, Ohio act regulating the.....(No. 3) 155
Loan shark evil, Conference on the, A. H. Ham.....(No. 3) 156
Loans in Massachusetts, Report of the committee on small.....(No. 3) 163
Loss from accidents, Edgar A. Bancroft.....(No. 1) 5
Lowles, D. C. The scope of a Service department.....(No. 1) 6
Lowles, D. C. Top-Notcher system for salesmen.....(No. 3) 124

McKeon, Peter J. Standards of safety from fire in factory buildings.....(No. 3) 125
Manning, William T. Accidents due to swift-moving machines and their automatic rational prevention(No. 2) 79
Medical department, Norton Company's, Irving Clark, M.D.....(No. 4) 230
Mutuality, W. A. Grieves.....(No. 2) 50
Muto, Sanji. Industrial service of the Kanegafuchi Spinning Co.....(No. 4) 195

Norton Company's medical department, The, Irving Clark, M.D.....(No. 4) 230

Occupational diseases(No. 1) 24
Occupational diseases, Alice Hamilton, M.D.....(No. 3) 142
On file, John Kendrick Bangs.....(No. 2) 68

Political and Social Science in Philadelphia, Annual meeting of American Academy.....(No. 2) 88
Postal Savings banks, The new.....(No. 2) 49
Pratt, E. E., and Talbot Winthrop, M.D. Preliminary directory of firms who have established methods of industrial betterment.....(No. 2) 95
Profit sharing in Detroit, A. A. Boutell.....No. 1) 20
Psychology of business.....(No. 1) 32
Public policy committee of the National Electric Light Association, Report of the.....(No. 3) 177

Quillen, B. B. The Cincinnati continuation school.....(No. 4) 227

Rankin trade school.....(No. 1) 34
Recruiting a factory force.....(No. 1) 34
Review, Current.....(Nos. 1, 2, 3, 4) 24, 92, 187, 279

Safety from fire in factory buildings, Standards of, Peter J. McKeon.....(No. 3) 125
Safety of employees—United States Steel Corporation, Provision for the, Raynal C. Bolling, (No. 4) 209
Sanitary control in the cloak, suit and skirt industry, Bulletin of the Board of.....(No. 3) 170
Sanitary, safe and comfortable working conditions, George W. Brown.....(No. 2) 60
Santa Fe efficiency system, H. W. Jacobs.....(No. 3) 106
Service department in a small business, Jane S. Klink.....(No. 3) 117
Service department, The scope of a, D. C. Lowles.....(No. 1) 6
Shop hygiene as a factor in efficiency, Winthrop Talbot, M.D.....(No. 4) 215
Shop sanitation and workmen's efficiency, Otto P. Geier(No. 4) 249
Significant gathering, A.....(No. 1) 35
Smith, Marie V. National Conference of Charities and Corrections.....(No. 3) 182
Smoke prevention(No. 1) 33
South American example, A, J. H. W.....(No. 2) 90
Spaulding, Russell. Bad air problems.....(No. 1) 9
State savings bank insurance.....(No. 3) 116
Stone, Warren S. The bonus system.....(No. 1) 15
Strikes in Buenos Aires.....(No. 3) 116
Suggestion system, Some principles underlying a successful, F. G. Haldy.....(No. 2) 86
Suggestion system, The, Miriam Birdseye.....(No. 1) 14
Survey, The(No. 1) 30

Talbot, Winthrop, M.D. The hygienic window.....(No. 1) 16
Talbot, Winthrop, M.D. Shop hygiene as a factor in efficiency.....(No. 4) 215
Talbot, Winthrop, M.D. A study in human engineering.....(No. 1) 3
Talbot Winthrop, M.D. Ventilation in workrooms.....(No. 2) 43
Talbot, Winthrop, M.D., and Pratt, E. E. Preliminary directory of firms who have established methods of industrial betterment.....(No. 2) 95
Thackera, A. M. Legal status of trusts in Germany(No. 1) 24
Thomas, Harry D. Co-operation.....(No. 1) 8
Top-Notcher system for salesmen, D. C. Lowles.....(No. 3) 124
Training table, The.....(No. 3) 186
Tresilian, Florence H., M.D. Learning a new process.....(No. 1) 21
Trusts in Germany. Legal status of, A. M. Thackera(No. 1) 24

Unemployment insurance, German experiments with.....(No. 1) 30

Ventilation(No. 1) 34
Ventilation and public health.....(No. 2) 44
Ventilation in workrooms, Winthrop Talbot, M.D.....(No. 2) 43
Vocational bureau of Cincinnati, The, Helen Thompson Wooley.....(No. 4) 259

Welfare work, Two years of successful, Emma S. Brittin.....(No. 2) 80
Whittemore, Violet A. Summary of report on conditions of women and child wage earners in the cotton textile industry.....(No. 2) 72
Winslow, C. E. A. Fresh air as a speed boss.....(No. 3) 173
Women and child wage earners in men's ready-made clothing industry, Review of report on condition of, L. H. Brittin.....(No. 3) 134
Women and child wage earners in the cotton textile industry, Summary of report on conditions of, Violet A. Whittemore.....(No. 2) 72
Women's welfare department—National Civic Federation, Mrs. John Hays Hammond.....(No. 4) 207
Wooley, Helen Thompson. The vocational bureau of Cincinnati.....(No. 4) 259
Working hours, Standard, Josephine Goldmark.....(No. 3) 150
Working hours for women, Limitation of.....(No. 1) 32
Workingmen's insurance, L. D. Brandeis.....(No. 3) 109

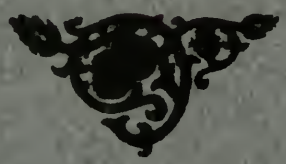
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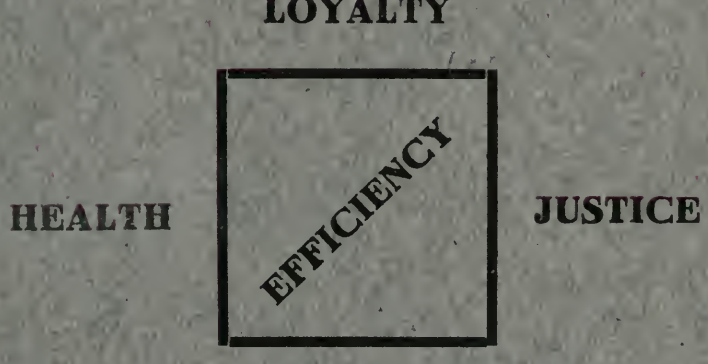
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—Andrew Carnegie